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DEPARTMENT OF THE NAVY

FY 1992/FY1993 BUDGET ESTIMATES
DESCRIPTIVE SUMMARIES (U)

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MAY 1 3 1991
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SUBMITTED TO CONGRESS FEBRUARY 1991
RESEARCH, DEVELOPMENT, TEST & EVALUATION, NAVY

AUTHORIZED FOR RELEASE TO THE GENERAL PUBLIC

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NAVY RDT&E
PROGRAM ELEMENT DESCRIPTIVE SUMMARIES

INTRODUCTION AND EXPLANATION OF CONTENTS

1. General. This document has been prepared to provide information on the Department of the Navy Research, Development, Test and Evaluation Program to Congressional committees during the FY 1992/1993 hearings. The Descriptive Summaries provide narrative information on all non-special access RDT&E Program Elements and Projects.

2. Comparison of Fiscal Data. A direct comparison of data in the Program Element Descriptive Summaries dated January 1990 will reveal significant differences. Many of the differences are attributable to the following factors:

a. FY 1991 reductions and increases as a result of Congressional action on the appropriation.

b. FY 1991 reductions, including proposed recissions and proposed above threshold reprogrammings to the Military Personnel, Navy appropriation and Ship Building and Conversion, Navy Appropriation.

c. FY 1990 funding changes including RDT&E Reprogramming Actions.

d. Reclassification of FY 1990 and FY 1991 data to achieve comparability with the program structure for FY 1992/FY1993.

3. Relationship of FY 1992/1993 Budget to the FY 1991 Budget Approved by Congress. The following is a list of all program elements which do not appear on the Base for Reprogramming Action (DD 1414) for Navy RDT&E which was prepared pursuant to final Congressional action on the FY 1991 DoD Budget Submission to Congress.

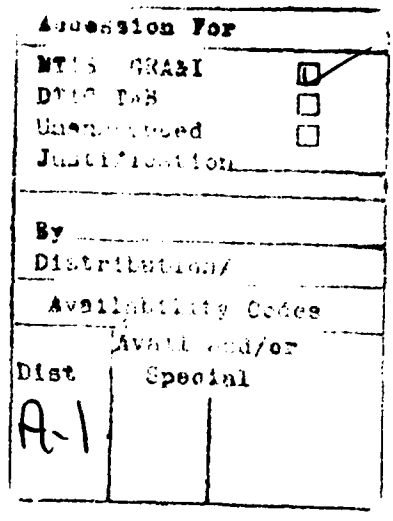
PGM ELEMENT	TITLE	REMARKS
0603270N	ELECTRONIC WARFARE TECHNOLOGY	FUNDED IN FY90
0603719N	CONT OFFLOAD & TRASFER PROGRAM	NEW START IN FY92
0603726N	MERCHANT SHIP NAVY AUGMENT PGM	NEW START IN FY92
0603794N	C^3 ADVANCED TECHNOLOGY	NEW START IN FY92
0603795N	GUN WEAPON SYSTEMS TECHNOLOGY	NEW START IN FY92
0604373N	AIRBORNE MCM	FUNDED IN 0603782N IN FY91
0604559N	UNMANNED UNDERWATER VEHICLE	FUNDED IN 0603561N IN FY91
0604714N	AIR W/F TRAINING DEVELOPMENT	NEW START IN FY92

4. Classification. Classified information is identified by use of brackets as [ ].

5. Table of Contents. The Table of Contents will be presented in two different formats this year - Alphabetically and in R-1 Line Item Order.

6. Highly Classified Programs. The following program elements are funded in FY 1992, however, due to classification are not provided in this document:

PROGRAM ELEMENT	TITLE
0301327N	TECH RECONN & SURV
0304111N	SPECIAL ACTIVITIES
0603525N	PILOT FISH
0603536N	RETRACT JUNIPER
0603551N	LINK SAKI
0603576N	CHALK EAGLE
0603591N	JOINT ADV SYSTEM
0603734N	CHALK CORAL
0603735N	WWMCCS ARCHITECTURE SUPPORT
0603737N	LINK HAZEL
0603740N	LINK LAUREL
0603746N	RETRACT MAPLE
0603748N	LINK PLUMERIA
0603750N	CHALK WEED
0603751N	RETRACT ELM
0603752N	CHALK POINSETTIA
0603787N	SPECIAL PROCESS



SECTION I

RDT&E,N DESCRIPTIVE SUMMARIES

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0204134N	A-6 SQUADRONS	197	47
0602111N	AAW/ASUW TECHNOLOGY	3	195
0603260N	ABN MINE COUNTERMEASURES	57	281
0604261N	ACOUSTIC SEARCH SENSORS	133	671
0603529N	ADVANCED ASW TARGET	75	369
0603217N	ADVANCED AIRCRAFT SUBSYSTEMS	18	269
0603504N	ADVANCED SUBMARINE ASW DEVELOPMENT	67	329
0604314N	ADVANCED MEDIUM AIR-TO AIR MISSILE (AMRAAM)	143	731
0603709N	ADVANCED MARINE BIOLOGICAL SYSTEM	101	497
0603747N	ADVANCED ANTI-SUBMARINE WARFARE TECHNOLOGY	31	543
0603656N	ADVANCED MINOR CALIB GUN	96	467
0603610N	ADVANCED WARHEAD DEVELOPMENT	90	427
0603561N	ADVANCED SUBMARINE SYSTEM DEVELOPMENT	80	383
0603792N	ADVANCED TECHNOLOGY TRANSITION	31	561
0604610N	ADVANCED LIGHTWEIGHT TORPEDO	176	869
0603570N	ADVANCED NUCLEAR POWER SYSTEMS	83	395
0603321N	ADVANCED AIR-TO-AIR MISSILE (AAAM)	64	313
0603318N	ADVANCED SURFACE-AIR MISSILE	61	301
0604303N	AEGIS AREA AIR DEFENSE	140	717
0604307N	AEGIS COMBAT SYSTEM ENGINEERING	141	719
0604504N	AIR CONTROL	156	787
0603254N	AIR ANTI-SUBMARINE WARFARE	56	279
0604714N	AIR W/F TRAINING DEVELOPMENT	185	895
0603207N	AIR/OCEAN TACTICAL APPLICATIONS	50	253
0604218N	AIR/OCEAN EQUIPMENT ENGINEERING	128	607
0604265N	AIR LAUNCH SATURATION SYSTEM	136	689
0604354N	AIR-TO-AIR MISSILE SYSTEMS ENGINEERING (AAM)	144	735
0604219N	AIRBORNE ASW DEVELOPMENTS	129	609
0604373N	AIRBORNE MCM	153	777
0603210N	AIRCRAFT PROPULSION	17	263
0205633N	AIRCRAFT EQUIPMENT RELIABILITY/MAINT PROG	210	107
0604268N	AIRCRAFT ENGINE COMPONENT IMPROVEMENT PROGRAM	137	693
0602122N	AIRCRAFT TECHNOLOGY	5	203
0604264N	AIRCREW SYSTEMS DEVELOPMENT	135	685
0603216N	AIRCREW SYSTEMS TECHNOLOGY	52	265
0204413N	AMPHIBIOUS TACTICAL SUPPORT UNIT	205	87
0602314N	ANTI-SUBMARINE WARFARE TECHNOLOGY	11	227
0604704N	ANTI-SUBMARINE WARFARE OCEANOGRAPHIC EQUIP	181	885

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0205620N	ASW COMBAT SYSTEMS INTEGRATION	209	103
0603785N	ASW ENVIRONMENTAL ACOUSTIC SUPPORT	119	555
0604233N	ATA	131	645
0604214N	AV-8B AIRCRAFT (ENGINEERING)	126	595
0603382N	BATTLE GROUP AAW COORDINATION (BGAAWC)	65	317
0604609N	BOMB FUZE IMPROVEMENTS	175	867
0604260N	C/MH-53E	132	669
0605867N	C^2 SURVEILLANCE/RECONNAISSANCE SUPPORT	196	1013
0603794N	C^3 ADVANCED TECHNOLOGY	33	567
0605154N	CENTER FOR NAVAL ANALYSIS	242	939
0604506N	CHEMICAL WARFARE COUNTERMEASURES	157	793
0604358N	CLOSE-IN WEAPON SYSTEM (PHALANX)	146	743
0603582N	COMBAT SYSTEM INTEGRATION	86	407
0604518N	COMBAT INFORMATION CENTER CONVERSION	162	809
0602232N	COMMAND, CONTROL & COMMUNICATIONS TECHNOLOGY	7	211
0603717N	COMMAND AND CONTROL SYSTEM	104	511
0303401N	COMMUNICATIONS SECURITY	231	171
0603719N	CONT OFFLOAD & TRANSFER SYSTEM	105	519
0603609N	CONVENTIONAL MUNITIONS	89	419
0603228N	CV ASW MODULE	54	273
0604559N	DEEP SUBMERGENCE TECHNOLOGY	164	821
0601153N	DEFENSE RESEARCH SCIENCES	2	191
0305160N	DEFENSE METEOROLOGICAL SATELLITE PROGRAM	258	181
0204152N	EARLY WARNING AIRCRAFT SQUADRONS	199	63
0603720N	EDUCATION AND TRAINING	28	521
0604577N	EHF SATCOM	226	845
0603573N	ELECTRIC DRIVE	22	403
0605803N	ELECTRO-MAGNETIC SPECTRUM MANAGEMENT	195	947
0604270N	ELECTRONIC WARFARE DEVELOPMENT	138	697
0603270N	ELECTRONIC WARFARE TECHNOLOGY	19	297
0604255N	ELECTRONIC WARFARE SIMULATOR DEVELOPMENT	236	651
0602270N	ELECTRONIC WARFARE TECHNOLOGY	10	223
0101401N	ELF COMMUNICATIONS	44	33
0603721N	ENVIRONMENTAL PROTECTION	234	523
0603303N	ERASE TECHNOLOGY	20	299
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0205667N	F-14 UPGRADE	211	111

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0604369N	FIVE INCH ROLLING AIR FRAME MISSILE	150	765
0604784N	FIXED DISTRIBUTED SYSTEM	194	923
0605155N	FLEET TACTICAL DEVELOPMENT AND EVALUATION	243	943
0603711N	FLEET TACTICAL D&E PROGRAM	102	499
0204163N	FLEET TELECOMMUNICATIONS (TAC)	201	67
0603712N	GENERIC LOGISTICS R&D TECHNOLOGY	27	501
0603795N	GUN WEAPON SYSTEM TECHNOLOGY	121	569
0604213N	HELICOPTER DEVELOPMENT	125	589
0603701N	HUMAN FACTORS ENGINEERING	24	473
0604211N	IFF SYSTEM DEVELOPMENT	123	577
0601152N	IN-HOUSE INDEPENDENT LABORATORY RESEARCH	1	187
0602936N	INDEPENDENT EXPLORATORY DEVELOPMENT	16	245
0708011N	INDUSTRIAL PREPAREDNESS	259	1023
0603109N	INTEGRATED AIRCRAFT AVIONICS	49	249
0604761N	INTELLIGENCE	191	913
0605857N	INTERNATIONAL RDT&E	248	961
0604780M	JINTACCS MARINE CORPS	193	921
0604654N	JOINT SERVICE EXPLOSIVE ORDNANCE DIS DEV	178	879
0603654N	JOINT SERVICE EXPLOSIVE ORDNANCE DISP DEV	95	463
0604727N	JOINT STANDOFF WEAPONS	190	909
0205658N	LABORATORY FLEET SUPPORT	256	109
0604212N	LAMPS	124	585
0603320N	LOW COST ANTI-RADAR SEEKER	63	309
0605853N	MANAGEMENT AND TECHNICAL SUPPORT	247	951
0603707N	MANPOWER & PERSONNEL SYSTEMS	26	489
0604717M	MARINE CORPS COMBAT SERVICES	187	901
0206623M	MARINE CORPS COMBAT/SUPPORTING ARMS SYSTEM	215	127
0604612M	MARINE CORPS COUNTERMEASURES (ENG)	177	873
0206626M	MARINE CORPS COMMAND/CONTROL/COMM SYS	218	149
0602131M	MARINE CORPS LANDING FORCE TECHNOLOGY	6	207
0604718M	MARINE CORPS INTELLIGENCE/ELECT WARFARE SYS	188	903
0604656M	MARINE CORPS ASSAULT VEHICLE	179	881
0206625M	MARINE CORPS INTELLIGENCE/ELEC WARFARE SYS	217	141
0206624M	MARINE CORPS COMBAT SERVICES SUPPORT	216	137
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0605156M	MARINE CORPS OPERATIONS TEST AND EVALUATION	244	945
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0605871M	MC TACTICAL EXPLOITATIONS OF NATIONAL CAP	254	1019
0603640M	MC ADVANCED TECHNOLOGY DEMONSTRATION	23	453
0604719M	MC COMMAND/CONTROL/COMMUNICATIONS SYSTEM	189	905
0603635M	MC GROUND COMBAT/SUPPORTING ARMS SYSTEMS	94	447
0605153M	MCOAG, CENTER FOR NAVAL ANALYSIS	241	937
0603706N	MEDICAL DEVELOPMENT	25	483
0604771N	MEDICAL DEVELOPMENTS	192	915
0603726N	MERCHANT SHIP NAVY AUGMENTED PROGRAM	108	537
0303603N	MILSTAR SATELLITE COMMUNICATION SYSTEM	232	177
0604601N	MINE DEVELOPMENT	170	851
0603601N	MINE DEVELOPMENT	88	413
0602315N	MINE & SPECIAL WARFARE TECHNOLOGY	12	231
0303131N	MINIMUM ESSENTIAL EMERGENCY COMMUNICATION NET	47	165
0602233N	MISSION SUPPORT TECHNOLOGY	8	215
0603691N	MK 48 ADCAP (ADV DEV)	97	469
0604301N	MK-92 FIRE CONTROL SYSTEM UPGRADE	139	713
0603319N	NATO AAW SYSTEMS	62	305
0604361N	NATO SEA SPARROW	147	747
0604602N	NAVAL GUNNERY IMPROV	171	855
0604514N	NAVIGATION SYSTEMS	225	799
0604777N	NAVSTAR GLOBAL POSITIONING SYSTEM	227	917
0605866N	NAVY C^2 TOP LEVEL WARFARE REQS	228	1011
0604710N	NAVY ENERGY PROGRAM	183	889
0102427N	NAVY SPACE SURVEILLANCE SYSTEM	46	45
0603231N	NAVY ATF	55	275
0603724N	NAVY ENERGY PROGRAM	106	531
0101402N	NAVY STRATEGIC COMMUNICATION	45	37
0604507N	NAVY STD SIGNAL PROCESSOR	158	795
0604372N	NEW THREAT UPGRADE	152	769
0603528N	NON ACOUSTIC ANTI-SUBMARINE WARFARE	74	365
0602324N	NUCLEAR PROPULSION	14	239
0603713N	OCEAN ENGINEERING TECHNOLOGY DEVELOPMENT	103	507
0603702N	OCEAN ENGINEERING SYSTEM DEVELOPMENT	98	477
0602435N	OCEAN & ATMOSPHERIC SUPPORT TECHNOLOGY	15	241
0605865N	OPERATIONAL TEST AND EVALUATION CAPABILITY	253	1009
0205675N	OPERATIONAL REACTOR DEVELOPMENT	213	119
0604221N	P-3 MODERNIZATION PROGRAM	130	613

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0605872N	PRODUCTIVITY INVESTMENT	255	1021
0604508N	RADAR SURVEILLANCE EQUIPMENT	159	797
0603542N	RADIOLOGICAL CONTROL	77	373
0604208N	RANGE INSTRUMENTATION SYSTEM DEV (RISD)	235	575
0605863N	RDT&E,N SHIP AND AIRCRAFT SUPPORT	251	981
0605861N	RDT&E,N LABORATORY AND FACILITY MAGMT SUP	249	965
0605862N	RDT&E,N INSTRUMENTATION AND MATERIAL SUP	250	973
0303109N	SATELLITE COMMUNICATIONS	230	161
0204313N	SHIP TOWED ARRAY SURVEILLANCE SYSTEMS	204	83
0603508N	SHIP PROPULSION SYSTEM	21	343
0603514N	SHIP COMBAT SURVIVABILITY	71	355
0604567N	SHIP SUBMARINE SYSTEM DEV/LBTS	167	833
0603564N	SHIP DEVELOPMENT	82	391
0604516N	SHIP SURVIVABILITY	161	805
0603513N	SHIPBOARD SYSTEM COMP DEVELOPMENT	70	349
0603512N	SHIPBOARD AVIATION SYSTEMS	69	345
0603733N	SIMULATION & TRAINING DEVICES	30	541
0603222N	SKIPPER MODS	53	271
0204571N	SPECIAL PROJECTS	206	89
0101224N	SSBN SECURITY TECHNICAL PROGRAM	41	21
0603588N	SSBN SURVIVABILITY	36	409
0604561N	SSN-21 DEVELOPMENT	165	825
0604203N	STANDARD AVIONICS DEVELOPMENT	122	571
0604366N	STANDARD MISSILE IMPROVEMENTS	148	755
0604574N	STANDARD EMBEDDED COMPUTER RESOURCES	168	837
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0605152N	STUDIES AND ANALYSIS SUPPORT, NAVY	240	929
0605151M	STUDIES AND ANALYSIS SUPPORT, MARINE CORPS	239	927
0101226N	SUB ACOUSTIC WARFARE DEVELOPMENT	42	25
0604515N	SUBMARINE SUPPORT EQUIPMENT	160	801
0604524N	SUBMARINE COMBAT SYSTEM	163	813
0604562N	SUBMARINE TACTICAL WARFARE SYSTEM	166	829
0604503N	SUBMARINE SONAR DEVELOPMENT	155	783
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0603522N	SUBMARINE ARCTIC WARFARE SUP EQUIP PROG	72	363
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0603553N	SURFACE ASW	79	377
0604608N	SURFACE ELECTRO-OPTICAL SYSTEM	174	863
0604715N	SURFACE WARFARE TRAINING DEVELOPMENT	186	897
0603502N	SURFACE MINE COUNTERMEASURES	66	325
0604713N	SURFACE ASW SYSTEM IMPROVEMENT	184	891
0602234N	SYSTEMS SUPPORT TECHNOLOGY	9	219
0603208N	T-45 TRAINING SYSTEM	51	259
0603261N	TACTICAL AIR RECONNAISSANCE	58	287
0603634N	TACTICAL NUCLEAR DEVELOPMENT	93	443
0603451N	TACTICAL SPACE OPERATIONS	35	321
0205670N	TACTICAL INTELLIGENCE PROCESSING SUPPORT	212	117
0604231N	TACTICAL COMMAND SYSTEM	224	627
0205604N	TACTICAL INFORMATION SYSTEM	208	93
0604258N	TARGET SYSTEMS DEVELOPMENT	237	659
0605804N	TECHNICAL INFORMATION SERVICES	246	949
0605864N	TEST AND EVALUATIONS SUPPORT	252	991
0604707N	THEATER MISSION PLAN CENTER	182	887
0604367N	TOMAHAWK	149	761
0208010M	TRI TAC MARINE CORPS	220	157
0604363N	TRIDENT II	38	749
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0204311N	UNDERSEA SURVEILLANCE SYSTEM	203	79
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0604355N	VERTICAL LAUNCH ASROC	145	739
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0602131M	MARINE CORPS LANDING FORCE TECHNOLOGY	6	207
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0603210N	AIRCRAFT PROPULSION	17	263
0603217N	ADVANCED AIRCRAFT SUBSYSTEMS	18	269
0603270N	ELECTRONIC WARFARE TECHNOLOGY	19	297
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0603508N	SHIP PROPULSION SYSTEM	21	343
0603573N	ELECTRIC DRIVE	22	403
0603640M	MC ADVANCED TECHNOLOGY DEMONSTRATION	23	453
0603701N	HUMAN FACTORS ENGINEERING	24	473
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0603720N	EDUCATION AND TRAINING	28	521
0603732M	MARINE CORPS ADVANCED MANPOWER/TRAINING SYS	29	539
0603733N	SIMULATION & TRAINING DEVICES	30	541
0603747N	ADVANCED ANTI-SUBMARINE WARFARE TECHNOLOGY	31	543
0603792N	ADVANCED TECHNOLOGY TRANSITION	31	561
0603794N	C^3 ADVANCED TECHNOLOGY	33	567
0603451N	TACTICAL SPACE OPERATIONS	35	321
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0603506N	SURFACE SHIP TORPEDO DEFENSE	68	333
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0603513N	SHIPBOARD SYSTEM COMP DEVELOPMENT	70	349
0603514N	SHIP COMBAT SURVIVABILITY	71	355
0603522N	SUBMARINE ARCTIC WARFARE SUP EQUIP PROG	72	363
0603528N	NON ACOUSTIC ANTI-SUBMARINE WARFARE	74	365
0603529N	ADVANCED ASW TARGET	75	369
0603542N	RADIOLOGICAL CONTROL	77	373
0603553N	SURFACE ASW	79	377
0603561N	ADVANCED SUBMARINE SYSTEM DEVELOPMENT	80	383
0603562N	SUBMARINE TACTICAL WARFARE SYSTEM	81	389
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FY 1992 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0101221N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: Fleet Ballistic Missile Systems
PROGRAM NUMBER: J0091 PROJECT TITLE: SLBM System Improvement Program

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMP	TOTAL PROGRAM
J0091	SLBM System Improvement Program	19,052	23,028	14,812	11,319	Cont.	Cont.

B. (U) DESCRIPTION: This project currently provides assessments of and supports improvements to POSEIDON (C3), TRIDENT I (C4) and (in FY91) TRIDENT II (D5) Fleet Ballistic Missile Weapon Systems. It has the objective of extending the effectiveness and survivability of these vital strategic weapon systems. This project includes vulnerability and effectiveness assessments, integration of the NAVSTAR Global Positioning System (GPS) capability, and support of the Navigation Test Vehicle.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

a. (U) Vulnerability and effectiveness efforts included:

(1) (U) Determining the need and extent of countermeasures resulting from the threat of rapidly maturing sensors and related advanced state-of-the-art sensor/signal processing improvements.

(2) (U) Evaluating threat postulations.

(3) (U) Investigating Missile Guidance System vulnerability to potential boost and post-boost threats.

(4) (U) Assessing survivability implications of subsystem operations and formulating corrective measures.

(5) (U) Investigating potential system improvements.

(6) (U) Investigating methods for reducing submarine observability by increasing the interval between SSBN navigation updates.

(7) (U) Investigating critical signature characteristics of the C3 and C4 weapon systems.

b. (U) Continued planning and validation effort for integration of NAVSTAR GPS.

2. (U) FY 1991 Program:

a. (U) Continue vulnerability and effectiveness efforts conducted in FY 1990.

b. (U) Continue development effort for integration of the NAVSTAR Global Positioning System (GPS) receiver equipment into the navigation subsystem.

c. (U) Provide support for Navigation Test Vehicle.

PROGRAM ELEMENT: 0101221N **BUDGET ACTIVITY:** 3
PROGRAM ELEMENT TITLE: Fleet Ballistic Missile Systems
PROGRAM NUMBER: J0091 **PROJECT TITLE:** SLBM System Improvement Program

3. (U) FY 1992 Plans:

a. (U) Continue to identify potential improvements to the TRIDENT I (C4) Fleet Ballistic Missile Weapon System in order to decrease potential vulnerabilities and maintain system effectiveness. Similar effort for POSEIDON (C3) will be terminated due to the impending retirement of this system. TRIDENT I (C4) effort will include:

(1) (U) Evaluation of threat postulations and determination of the need for, as well as the nature and extent of required countermeasures.
(2) (U) Determination of missile guidance system vulnerability to potential boost and post-boost threats.
(3) (U) Examination of critical signature characteristics of deployed weapon systems.

b. (U) Enter engineering development for integration of NAVSTAR GPS receiver equipment into the navigation subsystem of the strategic weapon system.

c. (U) Provide support for the Navigation Test Ship.

4. (U) FY 1993 Plans:

a. (U) Continue FY 1992 efforts to identify potential improvements to the TRIDENT I (C4) Fleet Ballistic Missile Weapon System in order to decrease potential vulnerabilities and maintain system effectiveness.

b. (U) Continue engineering development for integration of NAVSTAR GPS receiver equipment into the navigation subsystem.

c. (U) Continue support for the Navigation Test Ship.

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: Strategic Systems Programs, Washington, DC. CONTRACTORS: Charles Stark Draper Laboratory, Cambridge, MA; Kaman Sciences Corporation, Colorado Springs, CO; Lockheed Missiles and Space Company, Sunnyvale, CA; Rockwell International Corporation, Anaheim, CA; UNISYS Corp., Shipboard and Ground Systems Group, Great Neck, NY.

E. (U) COMPARISON WITH REVISED FY 1991 PRESIDENT'S BUDGET:
1. (U) Technical changes: None
2. (U) Schedule changes: None
3. (U) Cost changes: FY1991 (-9901) - D-5 Vulnerability & Effectiveness deleted.

F. (U) PROGRAM DOCUMENTATION:
Vulnerability and Effectiveness Program NAPDD - 4/86
NAVSTAR GPS Receiver Equipment NAPDD - 5/86

PROGRAM ELEMENT: 0101221N **BUDGET ACTIVITY:** 3
PROGRAM ELEMENT TITLE: Fleet Ballistic Missile Systems
PROGRAM NUMBER: J0091 **PROJECT TITLE:** SLBM System Improvement Program

G. (U) **RELATED ACTIVITIES:** Program Element 0604363N, TRIDENT II - Development of the TRIDENT II (D5) Strategic Weapon System; Program Element 0604777N, NAVSTAR GPS - Development of the NAVSTAR Global Positioning System.

H. (U) **OTHER APPROPRIATION FUNDS:** (Dollars in Millions)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT						
OPN 1/	60.9	53.9	73.4	49.7	Cont.	Cont.
WPN 2/	5.0	4.9	3.4	5.1	Cont.	Cont.

1/ These funds provide for the procurement of test instrumentation; equipment for maintenance, calibration, handling, data processing and tests at shore facilities; alterations to tactical hardware; new tactical hardware; and initial and replenishment spares and repair parts.

2/ These funds support spares and repair parts.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable

J. (U) MILESTONE SCHEDULE: Not applicable

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0101224N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: SSBN Security Technology Program
PROJECT NUMBER: R0092 PROJECT TITLE: SSBN Security Technology

A. (U) RESOURCES: (Dollars in thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0092	SSBN Security	41,594	42,769	53,270	74,418	CONT.	CONT.

B. (U) DESCRIPTION: The SSBN Security Program is to maintains the current covert mobility of the Fleet Ballistic Missile Submarine Force with respect to expanding Soviet and Third World ASW capabilities, concentrating on emerging applications of advanced technology in the ocean environment. This program identifies requirements for maintaining or enhancing the current tactical superiority and stealth characteristics of the Fleet Ballistic Missile submarine force.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:
   a. (U) Continued tactical development and operations analysis, including
   b. (U) Installed an experimental test bed to evaluate
   c. (U) Continued programs in
   d. (U) Demonstrated real-data processing of discerning from false alarms.
   e. (U) Performed at-sea measurements of characteristics.
   f. (U) Conducted a major sea test to evaluate capability, demonstrating from ambient measurements.
   g. (U) Conducted a sea trial in June 1990 to investigate detectability using
   h. (U) Investigated four additional non-acoustic technologies:

2. (U) FY 1991 PROGRAM:
   a. (U) Continue tactics development and operations analysis.
   b. (U) Conduct a sea test to evaluate

PROGRAM ELEMENT: 0101224N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: SSBN Security Technology Program
PROJECT NUMBER: R0092 PROJECT TITLE: SSBN Security Technology

c. (U) Continue programs in
d. (U) Complete development of an upgraded and conduct at-sea detectability testing.
e. (U) Continue investigations into detection of the including one at-sea test.
f. (U) Perform tests involving vulnerability. Initiate development of an Continue countermeasure evaluation.
g. (U) Perform a test of detection of signatures. Generate a preliminary detectability assessment.
h. (U) Conduct a major experiment.
i. (U) Conduct an at-sea experiment to measure signature.
j. (U) Conduct a major sea test to evaluate sensor concepts.

3. (U) FY 1992 PLANS:
a. (U) Design new system based on trial results, conduct a field test and commence fabrication of new breadboard system.
b. (U) Conduct system hardware modifications and a field test.
c. (U) Refine countermeasure system and conduct a field test.
d. (U) Develop final detectability assessment.
e. (U) Conduct breadboard sensor development and fabrication for laboratory testing.
f. (U) Continue programs in
g. (U) Continue to evaluate concepts.
h. (U) Continue tactics development and operational assessments.
i. (U) Perform the first test of detection of
j. (U) Initiate a program to investigate vulnerability of

4. (U) FY 1993 PLANS:
a. (U) Conduct field test and data analysis.
b. (U) Upgrade and refine countermeasure concept.
c. (U) Prepare final detectability analysis.
d. (U) Conduct field tests, data analysis, and model development.
e. (U) Continue programs in
f. (U) Continue to evaluate concepts.
g. (U) Continue tactics development and operational assessments.

PROGRAM ELEMENT: 0101224N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: SSBN Security Technology Program
PROJECT NUMBER: R0092 PROJECT TITLE: SSBN Security Technology

h. ( ) Prepare a preliminary detectability assessment on
Continue
measurements.

5. ( ) PROGRAM TO COMPLETION: This is a continuing program
b. ( ) Continue investigation of

c. ( ) Continue programs in

d. ( ) Continue to
e. (U) Continue tactics development and operational assessments.

D. (U) WORK PERFORMED BY: IN HOUSE: DTRC, Bethesda, MD; NAVOCEANSYSCEN, San Diego, CA; NAVOCEANO and NOARL, Bay St. Louis, MS; NUSC, New London, CT; NRL, Washington D.C. CONTRACTORS: Applied Physics Laboratory/Johns Hopkins University, Laurel, MD; TRW, McLean, VA; Systems Planning and Analysis Inc., Falls Church, VA; SRI International, Menlo Park, CA; Science Applications Inc., LaJolla, CA & McLean, VA; BB&N Laboratories, Cambridge, MA., Dynamics Technology Inc. Torrence, CA; Arete Associates; Kodak; AT&T Technologies, Arlington, VA.

E. ( ) COMPARISON WITH REVISED FY 1991 PRESIDENT'S BUDGET:
1. ( ) TECHNOLOGY CHANGES: Five non-acoustic technologies require investigation at a critical level of effort to ensure that phenomenon resolution and countermeasure concept development continues to outspace the threat. Specifically,
require invigorated investigation. Emerging technologies are being added to the program for investigation on a more aggressive schedule to ensure there is minimum risk to technological surprise.
2. (U) SCHEDULE CHANGES: NONE
3. (U) COST CHANGES: NONE

F. (U) PROGRAM DOCUMENTATION: NAPDD #011-02 1/86

G. (U) RELATED ACTIVITIES: PE 0603588N, SSBN Survivability.

H. (U) OTHER APPROPRIATED FUNDS: None. This is a non-acquisition program.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

J. (U) MILESTONE SCHEDULE: Continuing program; no milestones apply.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0101226N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: Sub Acoustic Warfare Development
PROJECT NUMBER: S1265 **PROJECT TITLE:** Sub Acoustic Warfare Development

A. (U) **RESOURCES:** (Dollars in Thousands)

NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
PROJECT S1265	Submarine Countermeasure Development	(13,191)*	30,897	37,216	40,841	CONT.	CONT.

* Previously funded under PE 0101221N, S1265.

B. (U) **DESCRIPTION:** This project was formerly part of PE 0101221N and has been separately identified under this new PE number. This project develops a Submarine Defensive Warfare System to improve the effectiveness and survivability of all classes of US submarines. It develops: a complete range of advanced sonar (ADC MK 4), Mobile Multi-Function (MMD) and special purpose (NLQ-1) countermeasure devices for submarine self defense including an advance Submarine Torpedo Defense (SMTD) device capable of interception and neutralization of future torpedo threat capabilities; external countermeasure launchers specifically configured to each submarine class for ready stowage and rapid launching of countermeasure devices including launcher quieting techniques to meet advanced submarine noise requirements; a consolidated command and control system (CMC2) for countermeasures inventory, status, tactical solutions, and launch management of all onboard countermeasure devices and launcher systems; and a New Sonar Intercept System (NSIS) including a torpedo recognition capability for early threat acquisition, classification and tracking.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:
   - a. (U) CSA MK 2:
     - (1) (U) Completed SSN 688 launcher system design.
     - (2) (U) Acquired Engineering Development Model (EDM) system and components.
   - b. (U) ADC MK 4:
     - (1) (U) Completed Critical Design Review (CDR)-1.
     - (2) (U) Completed EDM design/began EDM fabrication.
   - c. (U) New Sonar Intercept System (NSIS):
     - (1) (U) Issued Ordnance Requirement (OR) and completed specification.
     - (2) (U) Completed Advanced Development Model (ADM) contract procurement package.
   - d. (U) NLQ-1 Device:
     - (1) (U) Completed program start-up documentation/requirements.
     - (2) (U) Commenced design of (ADMs).
   - e. (U) MMD:
     - (1) (U) Completed program start-up documentation/requirements.
     - (2) (U) Commenced design of ADMs.
   - f. (U) CMC2:
     - (1) (U) Completed program start-up documentation/requirements.
     - (2) (U) Conducted feasibility testing w/ adv prototype model.
     - (3) (U) Began specification for ADM.

2. (U) FY 1991 PROGRAM:
   a. (U) CSA MK 2/Quiet Launch:
      (1) (U) Complete SSN 688 system testing/award production contract.
      (2) (U) Transition electromagnetic launch technology (EML) project from DARPA concept development.
      (3) (U) Complete EML start-up and associated program documentation.
   b. (U) ADC MK 4:
      (1) (U) Complete fabrication and testing of EDM units.
      (2) (U) Begin fabrication of Service Test Model (STM) units.
   c. (U) NSIS:
      (1) (U) Award competitive ADM system contract.
      (2) (U) Commence design of ADM system.
   d. (U) NLQ-1 Device:
      (1) (U) Complete design, fabrication and testing of breadboard models.
      (2) (U) Complete and finalize specification and fabricate ADM.
   e. (U) MMD Device:
      (1) (U) Complete design and begin fabrication of ADM units.
   f. (U) CMC2:
      (1) (U) Complete design and begin fabrication of ADM system.
   g. (U) SMTD Device:
      (1) (U) Begin transition to Advanced Development Phase.
      (2) (U) Begin development of start-up documentation/ requirements.
3. (U) FY 1992 PLANS:
   a. (U) ADC MK 4:
      (1) (U) Complete fabrication of STM units.
      (2) (U) Complete Technical and Operational evaluations.
      (3) (U) Obtain Milestone III production approval.
   b. (U) QUIET LAUNCHER:
      (1) (U) Complete EML ADM fabrication and testing.
      (2) (U) Obtain Milestone II FSED approval.
   c. (U) NSIS:
      (1) (U) Compete ADM system design.
      (2) (U) Commence fabrication of ADM unit.
   d. (U) NLQ-1 Device:
      (1) (U) Complete ADM testing and Obtain Milestone II approval.
      (2) (U) Complete EDM specification and award EDM/STM contract.
   e. (U) MMD Device:
      (1) (U) Complete ADM fabrication and testing.
      (2) (U) Obtain Milestone II FSED approval.
   f. (U) CMC2:
      (1) (U) Continue fabrication of ADM unit.
   g. (U) SMTD Device:
      (1) (U) Complete transition to Advanced Development.
      (2) (U) Complete start-up documentation/requirements.
      (3) (U) Complete ADM specifications and procurement package.
4. (U) FY 1993 PLANS:
   a. (U) ADC MK 4:
      (1) (U) Award production contract.
   b. (U) QUIET LAUNCHER:

(1) (U) Complete EML EDM design.

c. (U) NSIS:
(1) (U) Complete ADM fabrication and testing.
(2) (U) Complete EDM procurement specification.

d. (U) NLQ-1 Device:
(1) (U) Complete EDM design, fabrication, and begin testing.

e. (U) MMD Device:
(1) (U) Award EDM/STM contract.
(2) (U) Begin EDM design

f. (U) CMC2:
(1) (U) Complete fabrication and testing of ADM system.
(2) (U) Obtain Milestone II FSED approval.

g. (U) SMTD Device:
(1) (U) Award ADM contract and complete ADM design.

5. (U) PROGRAM TO COMPLETION: This is a continuing program

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSEA, Washington, DC; NCSC, Panama City, FL; NUSC, New London Lab/New London, CT. CONTRACTORS: NORDEN Systems, Melville, NY; Bendix Inc., Sylmar, CA; Librascope, Glendale, CA; Hazeltine Corp., Braintree, MA; EML Research, Hudson, MA.

E. (U) COMPARISION WITH REVISED FY 1991 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: None

2. (U) SCHEDULE CHANGES: Six month schedule slippage in NLQ-1, MMD, and CMC2 projects due to FY 90 funding loss of $3,194.

3. (U) COST CHANGE:

F. (U) PROGRAM DOCUMENTATION:

SYSTEM	TOR	DOP	OR	TEMP
CSA MK2/QUIET LAUNCH	N/A	N/A	12/76	#581 Rev 1 (08/90)
ADC MK 4	N/A	N/A	12/76	#1171 (03/88)
NSIS	9/85	6/86	9/90	#1351 IN PROCESS
NLQ-1	3/86	11/87	7/88	#1338 IN PROCESS
MMD	3/86	11/87	7/88	#1339 IN PROCESS
CMC2	3/86	11/87	7/88	#1340 IN PROCESS
SMTD	2/88	FY 91	FY 91	TBD FY 92

G. (U) RELATED ACTIVITIES: Low Frequency Analyzer, PE 0603588N, Project S1871

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT						
OPN-BA-2	21,856	23,893	19,203	23,742	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: N/A

J. (U) MILESTONE SCHEDULE:

SYSTEM	ADV DEV CONTRACT	MILESTONE II	FSED CONTRACT	OPEVAL	MILESTONE III (AFP)
CSA MK 2	N/A	N/A	N/A	1Q/88	1Q/89
QUIET LAUNCH	N/A	FY/92	N/A	FY/96	FY/96
ADC MK 4	N/A	3Q/88	4Q/88	FY/92	FY/92
NSIS	FY/91	FY/94	FY/94	FY/97	FY/97
NLQ-1	N/A	FY/92	FY/92	FY/96	FY/97
MMD	N/A	FY/92	FY/93	FY/96	FY/97
CMC2	N/A	FY/93	FY/94	FY/96	FY/97
SMTD	FY/93	FY/96	FY/96	FY/99	FY/00

FY 1992/93 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0101228N BUDGET ACTIVITY: 3-Strategic Programs
PROGRAM ELEMENT TITLE: TRIDENT I
PROJECT NUMBER: S0004 PROJECT TITLE: TRIDENT Submarine System Improvements

A. (U) RESOURCES: (Dollars in thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TOTAL PROGRAM
S0004	TRIDENT I	25,849	37,133	39,863	28,601	CONTINUING

B. (U) DESCRIPTION: The TRIDENT operational system development program conducts improvement and system integration to maintain the OHIO Class submarine capability against the threat throughout the life cycle of this key element of the strategic deterrent of TRIAD. The OHIO Class submarine is a long term U.S. Navy program for the modernization and orderly replacement of earlier deployed submarine ballistic missile systems (POLARIS and POSEIDON). This program is required to maintain an effective strategic deterrent against the nuclear attack on the U.S. or its allies.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. (U) Continued development of the following TRIDENT CLass Improvement Plan (CIP) items: RAM (Type 15L Periscope), SAWS 6" Countermeasure, Sonar Tactical Recording Improvements.
   b. (U) Completed development of the following TRIDENT CIP items: EHF Type 8J Periscope.
   c. (U) Continued TRIDENT Command and Control System (CCS) Engineering and Integration (E&I) efforts.
   d. (U) Continued development site support associated with CIP item efforts.
   e. (U) Continued Ship Control OPEVAL efforts.
   f. (U) Continued development and integration of CCS MK2 and AN/BQQ-5E into TRIDENT CCS.

2. (U) FY 1991 Program:
   a. (U) Initiate development of the following CIP items: EHF (Integrated Radio Room).
   b. (U) Continue development of the following CIP items: RAM (Type 15L Periscope), Sonar Tactical Recording Improvements, SAWS 6" Countermeasures.
   c. (U) Continue TRIDENT CCS E&I efforts.
   d. (U) Continue development site support associated with CIP item efforts.
   e. (U) Continue Ship Control OPEVAL efforts.
   f. (U) Continue development and integration of CCS MK 2 and AN/BQQ-5E into TRIDENT CCS.

3. (U) FY 1992 Plans:
   a. (U) Initiate development of the following CIP items: CVLF

receivers.

b. (U) Complete development of the following CIP items: SAWS 6" countermeasures, RAM (TYPE 15L), Sonar Tactical Recording Improvements

c. (U) Continue development of the following CIP items: EHF (Integrated Radio Room).

d. (U) Continue TRIDENT CCS E&I efforts.

e. (U) Continue development site support associated with CIP item efforts.

f. (U) Continue Ship Control OPEVAL efforts.

g. (U) Continue development and integration of CCS MK 2 and AN/BQQ-5E into TRIDENT CCS.

4. (U) FY 1993 Plans:

a. (U) Continue development of the following CIP items: CVLF Receivers, EHF (Integrated Radio Room).

b. (U) Continue TRIDENT CCS E&I efforts.

c. (U) Continue development site support associated with CIP item efforts.

d. (U) Continue Ship Control OPEVAL efforts.

e. (U) Complete development and integration of CCS MK 2 and AN/BQQ-5E into TRIDENT CCS.

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: In-house: Space and Naval Warfare Systems Command, Washington, DC; Naval Sea Systems Command, Washington, DC; David W. Taylor Research Center, Bethesda, MD; Naval Underwater Systems Center, Newport, RI, and New London, CT; Naval Undersea Warfare Engineering Station, Keyport, WA; TRIDENT Command and Control System Maintenance Activity, Newport, RI; Naval Ship System Engineering Station, Philadelphia, PA; Naval Coastal Systems Center, Panama City, FL; and Naval Weapons Systems Center, Crane, IN. Contractors: Electric Boat Division of General Dynamics Corp., Groton, CT; John Hopkins University, Applied Physics Laboratory, Laurel, MD; UNISYS Corp., St. Paul, MN; SPEARS Associates, Philadelphia, PA; General Electric, Camden, NJ; International Business Machines, Manassas, VA and Raytheon, Newport, RI.

E. (U) COMPARISON WITH REVISED FY 1991 PRESIDENT'S BUDGET:

1. (U) Technology Changes: None.

2. (U) Schedule Changes:

(A) CVLF Receiver development start delayed from FY 1990 to FY 1992.

(B) CCS Rev 5.2 Consolidated into Rev 5.1.

3. (U) Cost Changes: None.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

FY 1992/93 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0101228N BUDGET ACTIVITY: 3-Strategic Programs
PROGRAM ELEMENT TITLE: TRIDENT I
PROJECT NUMBER: S0004 PROJECT TITLE: TRIDENT Submarine System Improvements

G. (U) RELATED ACTIVITIES: Fleet Ballistic Missile System, PE 0101221N; TRIDENT II, Program Element 0604363N; SSBN Security, PE 0101224N; Extremely Low Frequency Communications, PE 0101401N; Navy Strategic Communications, PE 0101402N; Combat Control System Program, PE 0604562N; Submarine Sonar Program, PE 0604503N.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT						
OPN Strat Plat Supt Equip (24)	59,345	58,395	38,297	36,717	CONT	CONT
OPN Strat Plat Supt Equip (101 & 106)	88,720	206,800	209,241	162,164	CONT.	CONT.
OPN Strat Plat Supt Equip (227)	22,421	20,965	27,273	15,372	CONT.	CONT.

(U) MILCON

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

J. (U) MILESTONE SCHEDULE:

	Milestone	Date
1.	(U) Complete CCS Rev 5.0 Integration at LBEF	3Q/FY89
2.	(U) Complete CCS Rev 5.0 Certification at LBEF	4Q/FY89
3.	(U) Commence CCS Rev 4.3 AN/UYK-43 Installation	2Q/FY88
4.	(U) Commence CCS Rev 5.0 Installation	1Q/FY90
5.	(U) Commence CCS Rev 5.1 Integration at LBEF	4Q/FY90
6.	(U) Commence CCS Rev 5.1 Certification at LBEF	1Q/FY91
7.	(U) Commence CCS Rev 5.1 Installation	4Q/FY91
8.	(U) Commence CCS Rev 5.3 Integration	2Q/FY92
9.	(U) Commence CCS Rev 5.3 Certification	3Q/FY92
10.	(U) Commence CCS Rev 5.3 Installation	2Q/FY93

PROGRAM ELEMENT: 0101401N **BUDGET ACTIVITY:** 3
Strategic Programs
PROGRAM ELEMENT TITLE: ELF Communications
PROJECT NUMBER: X0792 **PROJECT TITLE:** ELF COMMUNICATIONS



A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	To Complete
Program Milestones			FOC 2092		
Engineering Milestones					
T&E Milestones		DT-IIIC	OT-III		
Contract Milestones					

BUDGET(K)	FY 1990	FY 1991	FY 1992	FY 1993	Prog. Total To Complete
Major Contract					
Support Contract				300	
In-House Support	100	103	537	245	
GFE/ Other					
Total	100	103	537	545	Continuing

PROGRAM ELEMENT: 0101401N BUDGET ACTIVITY: 3
Strategic Programs
PROGRAM ELEMENT TITLE: ELF Communications
PROJECT NUMBER: X0792 PROJECT TITLE: ELF COMMUMICATIONS

B. (U) DESCRIPTION: The Extremely Low Frequency (ELF) Communications System will provide a unique capability that will fulfill an important and immediate submarine command and control requirement by freeing the submarine from vulnerabilities and limitations of operating near the surface. Because current communications systems are unable to penetrate the ocean more than a few tens of feet, a submerged submarine must have a receiving antenna at or near the surface of the water. The ELF communications system will provide a capability to maintain continuous broadcast connectivity while submarines maneuver or transit at speeds and depths incompatible with Very Low Frequency reception capability. From FY 1992 through FY 1997, an anti-jamming capability will be developed. Hardware and software will be designed to modify the OR-279 receiver for DT and OT testing to increase the resistance of ELF to jamming. NUSC will initiate engineering development with risk programs and draft ELF specifications starting with one man-year in FY 1990 and building to 5 man-years by FY 1993 at which time a contractor will start development of the Engineering Development Model (EDM).

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:
   a. (U) Started anti-jam risk analysis.

2. (U) FY 1991 PROGRAM:
   a. (U) Continue anti-jam risk analysis.
   b. (U) Collect and analyze mission data and optimize antenna patterns.

3. (U) FY 1992 PLANS:
   a. (U) Attain Full Operational Capability 2QFY92.
   b. (U) Start anti-jam specification preparation.

4. (U) FY 1993 PLANS:
   a. (U) Complete anti-jam specification.
   b. (U) Contract for development of EDM hardware and software.

5. (U) PROGRAM TO COMPLETION:
   a. (U) Assess performance gain from new signal processing algorithms.
   b. (U) Develop Anti-jam hardware and software.
   c. (U) Analyze and develop techniques to increase data throughput.

D. (U) WORK PERFORMED BY: IN-HOUSE: NUSC, New London, CT
CONTRACTORS: TBD

PROGRAM ELEMENT: 0101401N **BUDGET ACTIVITY:** 3
Strategic Programs

PROGRAM ELEMENT TITLE: ELF Communications
PROJECT NUMBER: X0792 **PROJECT TITLE:** ELF COMMUNICATIONS

E. (U) **COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:**

1. **TECHNOLOGY CHANGES:** None
2. **SCHEDULE CHANGES:** None
3. **COST CHANGES:** None

F. (U) **PROGRAM DOCUMENTATION:**

CNO Requirement Letter	12/81
NDCP (MSII)	10/82
NDCP (MSIII)	6/87
NPDM (MSIII)	6/87
ILSP	6/87
TEMP	6/91

G. (U) **RELATED ACTIVITIES:** ELF communications capability will be installed in: TRIDENT Submarines - PE 0101228N; Fleet Ballistic Missile Submarines - PE 0101221N; Attack Submarines - PE 0204281N.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

APPN/P-1	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
SCN TRIDENT	450	450	450	450	TBD	TBD
SCN SSN 21	0	900	1,350	1,350	TBD	TBD

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

J. (U) TEST AND EVALUATION DATA: ELF TEMP REV #3, June 1991 - will Definitize DT-IIIC and OT-III.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0101402N **BUDGET ACTIVITY:** 3
PROGRAM ELEMENT TITLE: Navy Strategic Communications

A. (U) RESOURCES:

PROJECT NUMBER	TITLE	FY1990 ACTUAL	FY1991 ESTIMATE	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMP.	TOTAL PROGRAM
X1083	Shore to Ship Comm	15,865	6,714	15,171	21,666	Cont.	Cont.
W0793	TACAMO	13,951	10,247	14,764	7,669	0	Cont.
		29,816	16,961	29,935	29,335		Cont.

B. (U) DESCRIPTION: This program develops communications systems which provide positive command and control of deployed ballistic missile submarines (SSBNs). This program also provides enhancements to current shore-to-ship transmitting and receiving systems and the TACAMO airborne communications relay aircraft. The VLF/LF High Power Transmitter System (HPTS) and Dual Trailing Wire Antenna (DWTA) Systems for the E-6A TACAMO and the Air Force Airborne Command Post (EC-135) are required to communicate with the strategic bomber, missile and submarine forces. Additional upgrade of the E-6A TACAMO systems are required to ensure communications compatibility with World Wide Airborne Command Post (WWABNCP) aircraft, the USAF components that link TACAMO with other strategic communication platforms and systems. The Enhanced VERDIN System (EVS) provides a form, fit, and function replacement of obsolete processors and modulator/demodulator. The EVS enhancement improves the VLF broadcast system to FBM submarines, and adds a faster data rate capability. The Compact VLF system is an advanced, miniaturized VLF digital data processing receiving set that is designed to provide a reliable functional replacement to the Navy's present shipboard, airborne, and shore site VLF systems. The fixed LF/VLF program is an investigative effort to improve high voltage insulators, solid state power amplifiers, and atmospheric noise and propagation analysis.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0101402N **BUDGET ACTIVITY:** 3 Strategic Programs
PROGRAM ELEMENT TITLE: Navy Strategic Communications
PROJECT NUMBER: X1083 **PROJECT TITLE:** Shore to Ship Communications

A. (U) RESOURCES:

PROJECT NUMBER	TITLE	FY1990 ACTUAL	FY1991 ESTIMATE	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMP.	TOTAL PROGRAM
X1083	Shore to Ship Comm	15,865	6,714	15,171	21,666	Cont.	Cont.

B. (U) DESCRIPTION: This project develops communications systems which provide positive command and control of deployed ballistic missile submarines (SSBNs). This program provides enhancements to the shore-to-ship transmitting systems, shipboard receiver systems, and development of the Compact VLF (CVLF) receiver system including a Pluggable COMSEC Module (PCM). The fixed LF/VLF program investigates and develops replacement high efficient solid state power amplifiers, LF/VLF propagation predictions, and improvements to high voltage insulators.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

a. (U) Began development of modifications to correct CVLF receiver system deficiencies discovered in FY 1989 Operational Assessment.
b. (U) Submitted final test reports on field testing of Integrated VERDIN Transmit Terminal (IVTT) and completed performance specifications.
c. (U) Continued Strategic Communications Assessment Program (SCAP).
d. (U) Continued Coverage Prediction Improvement Program (CPIP) LF/VLF propagation.
e. (U) Continued High Voltage Insulation Program (HVIP).
f. (U) Continued Fixed VLF (FVLF) Bandwidth Enhancement.

FY 1992/1993 RDT&E,NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0101402N **BUDGET ACTIVITY:** 3 Strategic Programs
PROGRAM ELEMENT TITLE: Navy Strategic Communications
PROJECT NUMBER: X1083 **PROJECT TITLE:** Shore to Ship Communications

2. (U) **FY 1991 Program:**
   a. (U) Complete design of a modification to replace the obsolete CVLF microprocessor with the Pace Semiconductor 1750A microprocessor to improve throughput and allow supportability
   b. (U) Continue SCAP
   c. (U) Continue atmospheric studies (CPIP)
   d. (U) Continue HVIP
   e. (U) Start Solid State Power Amplifiers Replacement (SSPAR) FSD procurement package
   f. (U) Continue FVLF Landwidth Enhancement
3. (U) **FY 1992 Plans:**
   a. (U) Complete fabriction and testing of CVLF with improved microprocessor modification
   b. (U) Award contract for development of CVLF strategic enhancements including Non-Linear Adaptive Processing (NONAP)
   c. (U) Continue SCAP
   d. (U) Continue atmospheric studies (CPIP)
   e. (U) Award SSPAR Contract
   f. (U) Continue HVIP
4. (U) **FY 1993 Plans:**
   a. (U) Complete Critical Design Review (CDR) of CVLF strategic enhancement
   b. (U) Award contract for design of Pluggable COMSEC Module (PCM) for CVLF through CDR
   c. (U) Continue SCAP
   d. (U) Continue atmospheric studies (CPIP)
   e. (U) Continue SSPAR FSD
   f. (U) Continue HVIP
5. (U) **Program to Completion:**
   a. (U) Complete contractor and Navy testing of CVLF strategic enhancements, achieve Milestone III and issue production contract(s)
   b. (U) Complete PCM CDR
   c. (U) SCAP is a continuing program
   d. (U) Fleet introduction of CVLF receiver system
   e. (U) Atmospheric studies are a continuing effort (CPIP)
   f. (U) Complete SSPAR FSD and production
   g. (U) Continue HVIP

FY 1992/1993 RDT&E,NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0101402N **BUDGET ACTIVITY:** 3 Strategic Programs
PROGRAM ELEMENT TITLE: Navy Strategic Communications
PROJECT NUMBER: X1083 **PROJECT TITLE:** Shore to Ship Communications

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVOCEANSYSCEN San Diego, CA; NRL Washington, DC; NAVELEXCEN, Vallejo, CA; NAVWPNSUPPCEN Crane, IN.; NAVCIVENGRLAB, Port Hueneme, CA. **CONTRACTORS:** MITRE Corp., McLean, VA; Johns Hopkins University Applied Physics Laboratory, Laurel, MD; Rockwell International Corp., Richardson, TX; Telephonics, Farmingdale, NY.; C-Cubed Corp., Arlington, VA.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) Technology Changes: None
2. (U) Schedule Changes: The CVLF receiver system production is being delayed until completion of the Enhancements and NONAP development efforts. DT/OT and Milestone III have slipped 6 years due to the delay.
3. (U) Cost Changes: Increased cost, $11,547 in FY 1992 and out-years funds CVLF Enhancements/NONAP development and PCM initial development efforts and the FVLF SSPAR Program.

F. (U) PROGRAM DOCUMENTATION:

CVLF Operational Requirement	JUN 86
CVLF TEMP 838-3 (Rev. 1)	AUG 89
CVLF Acquisition Plan	SEP 89

G. (U) RELATED ACTIVITIES: PE 0101315Y and PE 0303131N

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

PROGRAM	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL
OPN #131	4485	1670	1346	3981	TBD	TBD

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable

J. (U) MILESTONE SCHEDULE:

(U) Compact VLF (CVLF) Receiver System:		
	Award Enhancements Development Contract	OCT 92
	DT/OT IIB Complete	JUL 95
	Milestone III - AFP	JAN 96
	Award LRIP Contract	JAN 97
	Fleet Introduction	APR 99
(U) Pluggable COMSEC Module (PCM):		
	Award PCM Dev. Contract	JAN 93
	DT/OT Complete	SEP 94
	Milestone III - AFP	TBD
	Award Production Contract	TBD
(U) Solid State Power Amplifier Replacement (SSPAR)		
	FSD RFP released	JUN 91
	Proposals for FSD received	AUG 91
	FSD contract award	FEB 92

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROJECT ELEMENT: 0101402N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: Navy Strategic Communications
PROJECT NUMBER: W0793 PROJECT TITLE: TACAMO

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMP.	TOTAL PROGRAM
W0793	TACAMO	13,951	10,247	14,764	7,669	0	93,292

B. (U) DESCRIPTION: BRIEF DESCRIPTION OF MISSION REQUIREMENT AND SYSTEM CAPABILITIES:

(1) HPTS: The VLF/LF High Power Transmitter System (HPTS) and Dual Trailing Wire Antenna (DWTA) Systems for the E-6A TACAMO and the Air Force Airborne Command Post (EC-135) are required to communicate with the strategic bomber, missile and submarine forces. The transmitter equipment (200KW) provides the E-6A TACAMO aircraft with a state-of-the-art system replacing tube-type equipment that is logistically unsupportable. The replacement DTWA will provide the E-6A TACAMO both short and long wire capability as well as provision for a utility wire deployment.

(2) BLOCK II: Additional upgrade of the E-6A TACAMO systems are required to ensure communications compatibility with World Wide Airborne Command Post (WWABNCP) aircraft, the USAF components that link TACAMO with other strategic communications platforms and systems. Extremely High Frequency Military Strategic Tactical and Relay (EHF MILSTAR), MILSTAR Processor, Time/Frequency Standard Distribution System (T/FSDS), and Global Positioning System (GPS) upgrades will be installed aboard the E-6A TACAMO as a Block II Upgrade Program. In addition to providing the required E-6A/WWABNCP compatibility, the installation of these systems will provide a significant increase in reliability and maintainability, enhance system communications capability, and provide increased supportability. Production of both HPTS and Block II are scheduled for concurrent installation.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:
   a. (U) Completed lab test of HPTS EDM's
   b. (U) Delivered EC-135 HPTS for contractor demo and test
   c. (U) Started MILSTAR EDM testing at NADC
   d. (U) Prepared Project Master Plan (PMP)
   e. (U) Completed HPTS Logistic Support Analysis (LSA)

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROJECT ELEMENT: 0101402N BUDGET ACTIVITY: 3 Strategic Programs
PROGRAM ELEMENT TITLE: Navy Strategic Communications
PROJECT NUMBER: WO793 PROJECT TITLE: TACAMO

2. (U) FY 1991 PROGRAM:
a. (U) Install HPTS on E-6A
b. (U) Deliver modified Flight Management Computer System (FMCS) for GPS
c. (U) Deliver MILSTAR message processor software
d. (U) Begin EDM development on T/FDS
e. (U) Released revised draft Request for Proposal (RFP) for Block II contract
f. (U) Release Block II RFP to industry

3. (U) FY 1992 PLANS:
a. (U) Begin Block II Full Scale Development
b. (U) Conduct TECHEVAL on E-6A HPTS
c. (U) Conduct tailored OPEVAL on E-6A HPTS
d. (U) Complete residual task/documentation for OPEVAL

4. (U) FY 1993 PLANS:
a. (U) Obtain approval for production of HPTS
b. (U) Conduct TECHEVAL for Block II

5. (U) PROGRAM TO COMPLETION:
a. (U) Conduct OPEVAL for Block II
b. (U) Award contract for Block II installation and integration production concurrent with HPTS production effort

D. (U) WORKED PERFORMED BY: IN-HOUSE: NAVAIRDEVCEN, Warminster, PA; NAVAIRTESTCEN, Patuxent River, MD; NAVAVIONICCEN, Indianapolis, IN; NAVOCEANSYSCEN, San Diego, CA; NAVAIRENGCEN, Lakehurst, N.J. CONTRACTORS: Rockwell for HPTS: Boeing, Smith's Industries for Block upgrades: MILSTAR contract award winners.

E. (U) COMPARISON WITH FY-1991 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: None

2. (U) SCHEDULE CHANGES: Effort to resolve complex HPTS technical issues delayed FSD by six months. Issues are now resolved and FSD is proceeding satisfactorily.

3. (U) COST CHANGES: None.

F. (U) PROGRAM DOCUMENTATION:
1. (U) HPTS

a. (U) NAVY/AF MOA	JUN 86
b. (U) ACQ PLAN	AUG 86
c. (U) NAVY PMP	APR 87
d. (U) FSD CONTRACT	APR 87

FY 1992/3 RDT&E, NAVY DESCRIPTION SUMMARY

PROJECT ELEMENT: 0101402N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: Navy Strategic Communications
PROJECT NUMBER: WO793 PROJECT TITLE: TACAMO

2. (U) BLOCK II
   a. (U) PMP FEB 90
   b. (U) ACQ PLAN APR 90
   c. (U) INSTALLATION CONTRACT OCT 91

G. (U) RELATED ACTIVITIES:

1. (U) Program Element 0303131F (Air Force) Minimum Essential Emergency Communications Network

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROC	8,771	15,313	19,523	41,476		
(U) O&M,N	3,000	23,000	26,000			

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: N/A

J. (U) MILESTONE SCHEDULE:

1. (U) HPTS
   a. (U) Contract Award 30 Apr 1987
   b. (U) Critical Design Review (CDR) 30 May - 2 Jun 1988
   c. (U) Navy TECHEVAL Oct-Feb 1992
   d. (U) Navy OPEVAL Mar-Apr 1992
   e. (U) Complete FSD Apr 1992
   f. (U) Navy Production Option Apr 1992

2. (U) BLOCK II:
   a. (U) Block Equipment Development FY-89 - FY-91
   b. (U) RFP Preparation (FSD) FY-89 - FY-90
   c. (U) Contract Award (FSD) FY-92
   d. (U) Start Prototype Installation FY-93
   e. (U) TECHEVAL/OPEVAL FY-93/4
   f. (U) AFP FY-94
   g. (U) Production Installation FY-96
      FY-96(3) FY-97(3) FY-98(4) FY-99(5)

FY 1992/93 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0102427N BUDGET ACTIVITY: 3

PROGRAM ELEMENT TITLE: Naval Space Surveillance System

PROJECT NUMBER: X0125 PROJECT TITLE: NAVSPASUR

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X0125	NAVSPASUR	755	860	805	828	Cont.	Cont.

B. (U) DESCRIPTION: The Naval Space Surveillance (NAVSPASUR) System is a dedicated one-of-a-kind, ground based radio interferometer system that provides continuous surveillance and unalerted detection of space objects crossing the continental United States. The associated transmitter and receiver stations are located on a great circle ranging from Glenville, GA to San Diego, CA. The unalerted detection of satellite launch, maneuver, and breakup is a vitally important intelligence capability. A catalog of space objects is maintained at the system computational and operations center in Dahlgren, VA where ocean area and unit-specific reconnaissance vulnerability reports are compiled and transmitted to fleet units. The NAVSPASUR Center is operationally responsible to the U.S. Space Command, Colorado Springs, CO for space object data collection functions performed as part of the National Space Detection and Tracking System and serves as the Alternate Space Surveillance and Space Defense Operations Centers. This project provides for research, development, and testing of improved sensor operational capabilities.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:
   a. (U) Completed physical functional and operational audit of system, subcomponents and interfaces related to digital receiver hardware.
   b. (U) Developed system specification reflecting audit results.
   c. (U) Established reliability assessment and recommended changes and/or replacements required to improve system availability.
2. (U) FY 1991 PROGRAM:
   a. (U) Develop Digital Receiver Replacement (DRR).
   b. (U) Initiate digital filter replacement development.
   c. (U) Support system analysis for OR development/tradeoffs.
   d. (U) Research orbit improvement and processing alternatives.
3. (U) FY 1992 PLANS:
   a. (U) Assess DRR Engineering Development Model (EDM) and implement requisite Engineering Change Proposal (ECPs).
   b. (U) Complete digital filter replacement development.
   c. (U) Initiate enhancements to system capability as specified in OR.
4. (U) FY 1993 PLANS:
   a. (U) Continue system enhancement development.
   b. (U) Initiate analog receiver replacement development.
   c. (U) Optimize tuning of processing functions.
5. (U) PROGRAM TO COMPLETION: This is a continuing program

D. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, DC.

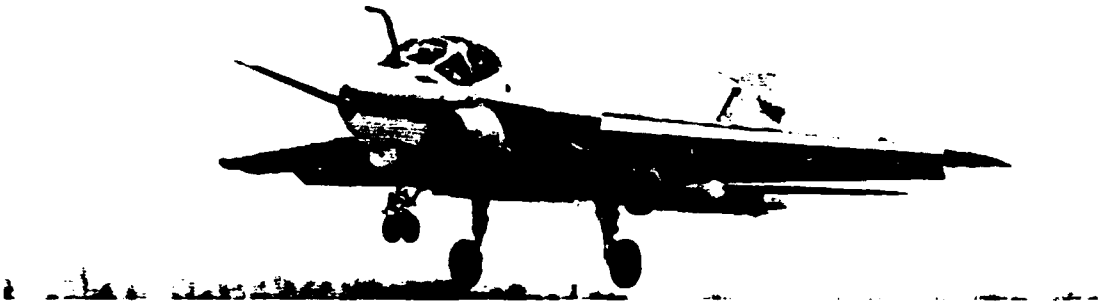
E. (U) RELATED ACTIVITIES: None.

F. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
OPN	0	2,158	2,911	100	Cont.	Cont.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

FY 1992/3 RDT&E,N NAVY DESCRIPTIVE SUMMARY
Program Element: 0204134N Budget Activity: 4
Program Element Title: A-6 Squadrons
Project Number: W1638 Project Title: A-6E Weapons Integration



POPULAR NAME: INTRUDER

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars In Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	TO COMPLETE
Program Milestones	250 DT 9/90	250 OT 5/91	PROTO 300 DT 6/92	300 DT 3/93	CONTINUING
Engineering Milestones	250 CDR 12/89	300 SCRB/FRR	300 SWRR	300 DES REV	CONTINUING
T&E Milestones	250 VRR 6/90	250 RR 11/90	300 V/V	300 TEST PLAN	CONTINUING
Contract Milestones			MST DEV COMPLETE 4/92		

BUDGET ($K)	FY 1990	FY 1991	FY 1992	FY 1993	PGM TOTAL
Major Contract					
Support Contract					
In-House Support	10,192	7,137	6,423	7,403	CONTINUING
GFE/ Other (Trainers)	16,300	14,200			$30,500
Total	26,492	21,337	6,423	7,403	CONTINUING

Program Element: 0204134N **Budget Activity:** 4
Program Element Title: A-6 Squadrons
Project Number: W1638 **Project Title:** A-6E Weapons Integration

B. (U) DESCRIPTION: This Program Element funds the continuing development and/or integration of the A-6 avionics, weapon systems and air vehicle to accommodate these system changes. These changes enhance A-6 all-weather reliability/ maintainability, capability and survivability. It also provides funds for munition support and updating of the A-6 Operational Flight Program (OFP). The System Weapons Integration Program (SWIP) provides for integration of a variety of standoff weapons (HARM, HARPOON IC, IR Maverick, Laser Maverick, SLAM, and WALLEYE) along with the advanced data link pod (AWW-13). Block IA, systems will also be incorporated in the OFP. In addition, the completion of development of the A-6 Weapon System Trainer (WST) is funded under this PE. Advanced Bomb Family (ABF) and Advanced Interdiction Weapons System (AIWS) will be integrated as the weapons schedule allows. Schedule milestones are for operational flight computer programs E/A-250 and E/A-300 series software.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. (U) Completed E/A-250 (HARM, Harpoon, Maverick, Walleye, Data Link Pod and SLAM) design and integration for A-6E.
   b. (U) Conducted Critical Design Review (CDR) and Validation Readiness Review for E/A-250.
   c. (U) Started joint DT/OT testing for E/A-250.
   d. (U) Continued development of A-6 WST.

2. (U) FY 1991 Program:
   a. (U) Commence TECHEVAL on SLAM and AWW-13 Pod.
   b. (U) Complete developmental testing of E/A-250.
   c. (U) Complete E/A-250 FOT&E.
   d. (U) Commence integration of new displays, navigation systems and weapons (AIWS/ABF) systems.
   e. (U) Design E/A-300 prototype software for IDAP, displays and navigation system integration with A-6E and new mission computer.
   f. (U) Perform OPEVAL on SLAM and AWW-13 pod.
   g. (U) Continue development of A-6 WST.
   h. (U) Start laboratory testing of replacement Mission Computer (CP-3X).

3. (U) FY 1992 Plans:
   a. (U) Complete E/A-300 prototype software design for IDAP, displays and navigation system integration with A-6E and new mission computer.
   b. (U) Conduct laboratory and flight tests to demonstrate that E/A-300 software meets requirements.

Program Element: 0204134N Budget Activity: 4
Program Element Title: A-6 Squadrons
Project Number: W1638 Project Title: A-6E Weapons Integration

c. (U) Complete software requirements specification for E/A-300 production software. Conduct the software requirements review.

d. (U) Continue AIWS and ABF integration.

4. (U) FY 1993 Plans:

a. (U) Continue developmental flight testing of the E/A-300 prototype software and complete the integration of the prototype display software.

b. (U) Complete design of the E/A-300 production software for IDAP, display, navigation, weapons systems and mission computer.

c. (U) Conduct design review for the E/A-300 production software.

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY:
IN-HOUSE: NAVAVIONICCEN, Indianapolis, IN, NAVAIRTESTCEN, Patuxent River, MD, NAVWPNCEN, China Lake, CA, NAVWPNEVALFAC, Albuquerque, NM, CONTRACTORS: Grumman Aerospace Corporation, Long Island, NY, McDonnell Douglas, Corporation, St. Louis, MO.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) TECHNICAL CHANGES: NONE
2. (U) SCHEDULE CHANGES: NONE
3. (U) COST CHANGES: NONE

F. (U) PROGRAM DOCUMENTATION: NONE

G. (U) RELATED ACTIVITIES: P.E. 0205601N - HARM Improvement, P.E. 0603306N - Advanced Air Launched Air-to-Surface Missile System, P.E. 0604727N - Joint Standoff Weapons, P.E. 0604270N - EW Technology.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
PROCUREMENT APN-5	109,960	97,312	564,485	434,930	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION DATA: See Congressional Data Sheet for A-6.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0204136N Budget Activity: 4
Program Element Title: F/A-18 HORNET SQUADRON

PICTURE NOT AVAILABLE

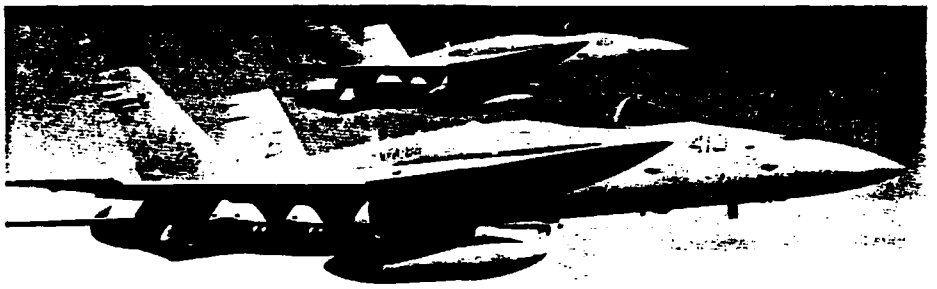
A. RESOURCES: (Dollars in Thousands)

Project Number	Title	FY 1990 Actual	FY 1991 Estimate	FY 1992 Estimate	FY 1993 Estimate	To Complete	Total Program
W1662	F/A-18 Improvements	11,801	11,905	18,776	14,325	Cont.	Cont.
WXXXX	Follow-On Variant			366,200	945,200	2,663,000	3,974,000
W2065	Radar Upgrade	21,457	64,432	50,101	41,656	22,332	199,978
TOTAL		33,258	76,337	435,077	1,001,181	Cont.	Cont.

B. DESCRIPTION: The F/A-18 is capable of using selected external equipment to perform either fighter or attack missions. The capabilities of the F/A-18 weapon system can be upgraded to accommodate and incorporate new or enhanced weapons as well as advances in technology to respond effectively to emerging future threats. Continued development capability is required to successfully integrate the F/A-18 weapon system into the Fleet. Additionally, continued improvements in reliability and maintainability are necessary to ensure maximum benefit is achieved through reduced cost of ownership and to provide enhanced availability. The F/A-18 Naval Strike Fighter program transitioned from full-scale engineering development to operational systems development during FY 1983. As F/A-18 squadrons report discrepancies and requirements, a continuing capability is needed to perform post-FSD technical evaluations, investigative flight testing, software support, and incorporate pre-planned product improvements (i.e., capability enhancements). The F/A-18 radar (APG-65) will be upgraded (APG-73) to operate in the projected electronic warfare environment of the 1990's. The follow-on F/A-18 (E/F version) is an airframe upgrade incorporating increased capabilities, performance, and survivabiliity necessary to satisfy the continuing requirement to implement new and more effective capability to counter emerging threats. The E/F version will have increased internal fuel capacity, carrier recovery payload, and engine thrust. It will retain all of the P3I efforts developed for the earlier C/D version of the aircraft. The block upgrade to the E/F variant (to replace the C/D) is scheduled to proceed with full scale development after the MSII decision in FY 1992.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0204136N Budget Activity: 4
Program Element Title: F/A-18 HORNET SQUADRON
Project Number: W1662 Project Title: F/A-18 IMPROVEMENTS



POPULAR NAME: HORNET

A. SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	To Complete
Program Milestones	(Program Milestones for this project are complete)				
Engineering Milestones					
T&E Milestones					
Contract Milestones					

BUDGET (SK)	FY 1990	FY 1991	FY 1992	FY 1993	Program Total To Complete
Major Contract	5,706	4,580	9,028	8,541	Continuing
Support Contract					
In-House Support	6,095	7,325	9,748	5,784	Continuing
GFE/ Other					
Total	11,801	11,905	18,776	14,325	Continuing

Program Element: 0204136N Budget Activity: 4
Program Element Title: F/A-18 HORNET SQUADRON
Project Number: W1662 Project Title: F/A-18 IMPROVEMENTS

B. DESCRIPTION: The F/A-18 is a multimission strike fighter aircraft that is used in fighter and attack roles through selected use of external equipment (such as external fuel tanks, targeting and navigation FLIR). The capabilities of the F/A-18 weapon system are being upgraded to accommodate and incorporate new or enhanced weapons including the AMRAAM, I^2R Maverick, Harpoon, and SLAM as well as other advances in technology such as night attack, reconnaissance, enhanced performance engine and radar upgrade to respond effectively to emerging future threats. Continued development capability in terms of software and hardware improvements is required to successfully optimize new F/A-18 weapon system capabilities in the fleet. Continued improvements in reliability and maintainability for the airframe, avionics, and engines are necessary to ensure maximum benefit is achieved through reduced cost of ownership and enhanced availability. As F/A-18 squadrons report system problems and requirements, a continuing capability is needed to perform post-Full Scale Development (FSD) technical evaluation, investigative flight testing, software support, and incorporate capability enhancements.

C. PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1990 Accomplishments:

a. Contractor investigation of aeronautical design modifications/changes to the F/A-18 fuselage and other structural deficiencies identified during deployments of the F/A-18 aircraft.

b. Continued technical and operational evaluations of Night Attack configured F/A-18.

c. Continued integration tests for AMRAAM, ASPJ, SLAM, I^2R MAVERICK, and AWW-13.

d. Continued flight testing at Naval Air Test Center (NATC), Patuxent River, MD, and Naval Weapons Center (NWC), China Lake, CA, centered around fleet reported problems and recommended improvements.

e. Initiated system development of Global Positioning System (GPS) and BQM-145.

f. Provide support to Advanced Tactical Airborne Reconnaissance System (ATARS)/Reconnaissance (RECCE) program for testing.

2. FY 1991 Program:

a. Contractor investigation of aeronautical design modifications/changes to the F/A-18 fuselage and any structural deficiencies identified during deployment of the F/A-18 aircraft.

b. Continue hardware and software integration tests for ATARS/RECCE.

Program Element: 0204136N Budget Activity: 4
Program Element Title: F/A-18 HORNET SQUADRONS
Project Number: W1662 Project Title: F/A-IMPROVEMENTS

c. Continue flight testing at NATC and NWC, centered around fleet reported problems and recommended improvements.

d. Initiate systems development and integration modifications to AIWS, and AN/ARC-210.

e. Continue system development of GPS, Advanced Special Receiver, ALE-47, BQM-145.

f. Investigate design efforts to integrate an all-weather reconnaissance capability into the AN/APG-73 radar (in lieu of a side looking radar pod).

g. Initiate development and integration of light weight gun.

h. Investigate integration and testing of the Advanced Airborne Expendable Decoy.

3. FY 1992 Plans:

a. Contractor investigation of aeronautical design modifications/changes to the F/A-18 fuselage, and any structural deficiencies identified during deployments of the F/A-18 aircraft.

b. Continue flight testing at NWC and NATC to resolve reported fleet problems and develop recommended improvements.

c. Investigate Pre-planned (P3I) design efforts to begin integration of CRT displays into I-NIGHTS helmet.

d. Initiate development of P3I design effort to incorporate an Air-to-Ground Multi-Sensor Integration capability in the aircraft.

e. Initiate design efforts to integrate light weight fuel cells into the aircraft.

f. Initiate integration testing of GPS, ALE-47, AIWS, ASR, BQM-145, and the lightweight gun.

g. Continue preliminary development program required to integrate an all-weather reconnaissance capability into the AN/APG-73 radar (in lieu of a side looking radar pod).

h. Initiate system development and integration of MARK XV IFF.

4. FY 1993 Plans:

a. Continue contractor investigation of aeronautical design modifications/changes to the F/A-18 fuselage and any structural deficiencies identified during deployment of the aircraft.

b. Continue flight testing at NWC and NATC to resolve reported fleet problems and develop recommended improvements.

c. Continue P3I design effort to integrate CRT displays into the I-NIGHTS helmet.

d. Continue integration of AIWS, BQM-145, ASR, the lightweight gun, and MARK XV IFF.

e. Continue development of P3I design effort to incorporate an Air-to-Ground Multi-Sensor Integration capability into the aircraft.

Program Element: 0204136N Budget Activity: 4
Program Element Title: F/A-18 HORNET SQUADRON
Program Number: M1662 Project Title: F/A-18 IMPROVEMENTS

5. Program to Completion: This is a continuing program.

D. WORK PERFORMED BY: IN-HOUSE: NAVAIRDEVCEN, Warminster, PA; NAVAIRENGCEN, Lakehurst, NJ; NAVAIRPROPCEN, Trenton, NJ; NAVORDSTA Indian Head, MD.; NAVWPNCEN, China Lake, CA; NAVWPNENGSUPACT, Washington, D.C.; COMPACMISTESTCEN, Point Mugu, CA; NAVAIRTESTCEN, Patuxent River, MD; NAVRESLAB, Washington, D.C. CONTRACTORS: McDonnell Aircraft Company, St. Louis, MO (Airframe and Weapon System integration); General Electric Company, Lynn, MA (F-404 Engine); Hughes Aircraft Company, Culver City, CA (Radar subcontractor to McDonnell); Northrop Aircraft Division, Hawthorne, CA (center/aft fuselage subcontractor to McDonnell); Control Data Corporation, Minneapolis, MN (ATARS).

E. COMPARISON WITH REVISED FY 1991 PRESIDENT'S BUDGET:

1. TECHNICAL CHANGES: Not applicable.

2. SCHEDULE CHANGES: Not applicable.

3. COST CHANGES: The adjustment of -$2.59M in FY 1991 will result in the delay of the following avionics improvements: Investigation and development of the data link and identification algorithms required for sensor integration; design of interactive sensor management algorithms; and initiation of the development of air-to-surface Multi-Source Integration (MSI). Additionally, the following efforts will be deferred: Development flights to determine Reconnaissance (RECCE) Flying Qualities & Performance; flight test support for AMRAAM flutter tests.

F. PROGRAM DOCUMENTATION:

F/A-18 DCP	9/86
F/A-18 C/D TEMP	9/87

G. RELATED ACTIVITIES: P.E. 0604214N AV-8B; P.E. 0604314N AMRAAM; P.E. 0604226N ASPJ; P.E. 0603306N AWW-13; PE 64725F MARK XV IFF; PE 64270N ALE-47; PE 0604270N ALR-67 (ASR); PE 0604727N AIWS; P.E. 0603306N SLAM; P.E. 0604777N GPS; P.E. 0305141D BQM-145; P.E. 0603313N I2R MAVERICK; P.E. 0603261N ATARS/RECCE; P.E. 0204163N AN/ARC-210.

H. OTHER APPROPRIATION FUNDS: Not applicable.

I. INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. TEST AND EVALUATION: See Congressional Data Sheets.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0204136N Budget Activity: 4
Program Element Title: F/A-18 HORNET SQUADRON
Project Number: WXXXX Project Title: F/A-18 FOLLOW-ON VARIANT

POPULAR NAME: HORNET

A. SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	To Complete
Program Milestones			II/IV 3/92		IOC 2nd QTR/99
Engineering Milestones				PDR 11/92 CDR 5/93	1st Flt 1st QTR/95
T&E Milestones					DT-IIC OT-IIB 2nd,3rd QTR/96
Contract Milestones			FSED CONTRACT 3/92		

BUDGET (SK)	FY 1990	FY 1991	FY 1992	FY 1993	Program Total To Complete
Major Contract			336,904	831,776	3,130,400 1,961,720
Support Contract					
In-House Support			29,296	113,424	844,000 701,280
GFE/ Other					
Total			366,200	945,200	3,974,400 2,663,000

Program Element: 0204136N Budget Activity: 4
Program Element Title: F/A-18 HORNET SQUADRON
Project Number: WXXXX Project Title: F/A-18 FOLLOW-ON VARIANT

B. DESCRIPTION: The follow-on F/A-18 E/F is a derivative aircraft incorporating features such as (1) enhanced survivability/reduced vulnerability modification, (2) an advanced, highly integrated crew station, and (3) increased internal fuel, CV recovery payload, engine thrust, and mission range. The resulting improved combat performance, pilot awareness, and carrier suitability ensures this upgrade to the current version will continue to meet the evolving threat well into the next decade.

C. PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1990 Accomplishments: Not applicable.
2. FY 1991 Program: Not applicable.
3. FY 1992 Program:
   a. System engineering studies to reduce risk and provide data for configuration definition.
   b. Aircraft Configuration Definition based on the results of engineering studies.
   c. Detailed Specification generation.
   d. Engine risk reduction effort or initiation of engine source competition.
   e. Engine source selection (if competed).
   f. Detailed specification review and approval.
   g. Milestone II decision.
   h. FSD contract award.
   i. Contractor FSD aircraft design, analysis, and model testing.
   j. Subsystem design and testing.
   k. Software preliminary design.
   l. Long lead procurement

4. FY 1993 Plans:
   a. Continue design development tests.
   b. First engine testing/engine development tests.
   c. Preproduction component tests.
   d. Flight simulation.
   e. Flight article component dynamic tests.
   f. Major assembly (test aircraft).

5. Program to Completion:
   a. Continue Full-Scale Development leading to first flight in FY 1995.
   b. Milestone IIIA-1 decision anticipated in FY 1995 (Milestone IIIA-2 decision anticipated in FY 1996).

Program Element: 0204136N Budget Activity: 4
Program Element Title: F/A-18 HORNET SQUADRON
Program Number: WXXXX Project Title: F/A-18 FOLLOW-ON VARIANT

D. WORK PERFORMED BY: IN-HOUSE: NAVAIRDEVCEN, Warminster, PA; NAVAIRENGCEN, Lakehurst, NJ; NAVAIRPROPCEN, Trenton, NJ; NAVORDSTA Indian Head, MD.; NAVWPNCEN, China Lake, CA; NAVWPNENGSUPACT, Washington, D.C.; COMPACMISTESTCEN, Point Mugu, CA; NAVAIRTESTCEN, Patuxent River, MD; NAVRESLAB, Washington, D.C. CONTRACTORS: McDonnell Aircraft Company, St. Louis, MO (Airframe and Weapon System integration); General Electric Company, Lynn, MA (F-404 Engine); Hughes Aircraft Company, Culver City, CA (Radar subcontractor to McDonnell); Northrop Aircraft Division, Hawthorne, CA (center/aft fuselage subcontractor to McDonnell); Control Data Corporation, Minneapolis, MN (ATARS).

E. COMPARISON WITH REVISED FY 1991 PRESIDENT'S BUDGET:

1. TECHNICAL CHANGES: Not applicable.

2. SCHEDULE CHANGES: Not applicable.

3. COST CHANGES: Not applicable.

F. PROGRAM DOCUMENTATION:
Operational Requirement in routing.

G. RELATED ACTIVITIES: P.E. 0604214N AV-8B; P.E. 0604314N AMRAAM; P.E. 0604226N ASPJ; P.E. 0603306N AWW-13; P.E. 0604725F MARK XV IFF; P.E. 0604270 ALE-47; P.E. 0604270N ALR-67 (ASR); P.E. 0604727N AIWS; P.E. 0603306N SLAM; P.E. 0604777N GPS; P.E. 0305141D BQM-145; P.E. 0603313N I2R MAVERICK; P.E. 0603261N ATARS/RECCE; P.E. 0204163N AN/ARC-210

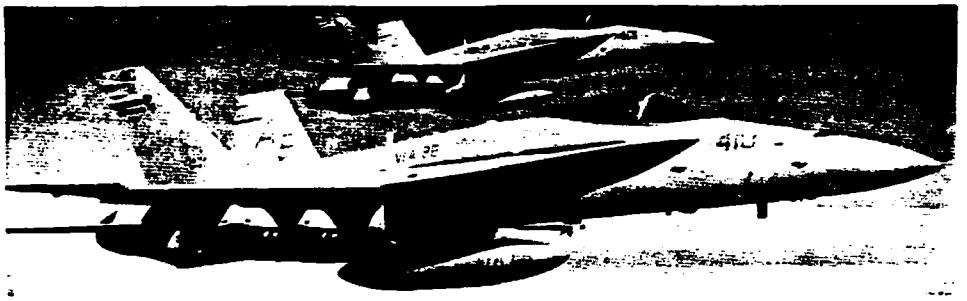
H. OTHER APPROPRIATION FUNDS: Not applicable.

I. INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. TEST AND EVALUATION: Not applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0204136N **Budget Activity:** 4
Program Element Title: F/A-18 HORNET SQUADRON
Project Number: W2065 **Project Title:** F/A-18 RADAR UPGRADE



POPULAR NAME: RADAR UPGRADE (RUG)

A. SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	FY1994	To Complete
Program Milestones		IIIA-1 5/91		IIIA-2 1/93	IIIB 4/94	IOC 8/95
Engineering Milestones	PDR 8/90	CDR(H/W) 3/91	CDR(S/W) 8/92			
T&E Milestones		BNCH TST 6/91	DT-II 12/92	OT-II 8/93		OTIIB 10/93
Contract Milestones	FSED CONTRACT 4/90					

BUDGET ($K)	FY 1990	FY 1991	FY 1992	FY 1993	Program Total To Complete
Major Contract	20,600	62,420	46,600	28,000	172,876 15,256
Support Contract					
In-House Support	857	2,012	3,501	13,656	27,102 7,076
GFE/ Other					
Total	21,457	64,432	50,101	199,978 41,656	22,332

Program Element: 0204136N Budget Activity: 4
Program Element Title: F/A-18 HORNET SQUADRON
Project Number: W2065 Project Title: F/A-18 RADAR UPGRADE

B. DESCRIPTION: The F/A-18 radar (AN/APG-65), requires an upgrade to improve electronic counter-countermeasure (ECCM) performance against improved threat electronic countermeasures (ECM). This threat ECM improvement has partially resulted from compromises in the F/A-18 radar performance against various threat electronic warfare systems. The AN/APG-73 radar follows and capitalizes on AN/APG-70 and AN/APG-71 developmental and value engineering programs to maximize shop replaceable assembly (SRA) commonality.

C. PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1990 Accomplishments:

a. Initiated radar hardware design/development.
b. Initiated design/development of Special Test Equipment (STE).
c. Defined software requirements.
d. Initiated software design.
e. Initiated design of MCAIR/China Lake radar test benches.
f. Signed MOU with Canada.
g. APG-73 Radar Upgrade Contract awarded.
h. Successfully completed RUG Preliminary Design Review.
i. Successfully completed Block I software Critical Design Review.

2. FY 1991 Program:

a. Complete installation of MCAIR/China Lake benches.
b. Perform bench integration with Mission Computer's display.
c. Continue hardware design/development.
d. Fabricate and assemble Engineering Development Models (EDM) radars.
e. Complete software Critical Design Reviews for Blocks II, III and IV.
f. Initiate roofhouse integration and testing of radar hardware and software.
g. Complete Operational Assessment.
h. Conduct Hardware Critical Design Review.
i. Conduct Production Readiness Review.
j. Milestone III A1 LRIP decision.

3. FY 1992 Plans:

a. Complete roofhouse integration and testing of radar hardware and software.
b. Initiate contractor flight testing and TECHEVAL of hardware and software design.

Program Element: 0204136N Budget Activity: 4
Program Element Title: F/A-18 HORNET SQUADRON
Project Number: W2065 Project Title: F/A-18 RADAR UPGRADE

c. Commence operational testing of hardware design/developments and software design/coding.
d. Accomplish software Critical Design Review.
e. Complete EDM development.

4. FY 1993 Plans:
a. Complete contractor flight testing and TECHEVAL of hardware and software designs.
b. Continue operational testing of hardware design/developments and software design/coding.
c. Conduct Operational Test Readiness Review prior to commencement of OPEVAL.
d. Commence OPEVAL with initial production representative units.

5. Program to Completion:
a. Continue operational testing of hardware design/developments and software design/coding.
b. Complete OPEVAL.
c. FSD Program completes in FY 1994.

D. WORK PERFOFMED BY: IN-HOUSE: NAVAIRDEVCEN, Warminster, PA; NAVAIRENGSUP, Lakehurst, NJ; NAVWPNCEN, China Lake, CA; NAVWPNENGSUPACT, Washington, D.C.; COMPACMISTESTCEN, Point Mugu, CA; NAVAIRTESTCEN, Patuxent River, MD; NAVRESLAB, Washington, DC. CONTRACTORS: McDonnell Aircraft Company, St. Louis, MO (Airframe and Weapon System Integration); Hughes Aircraft Company, Culver City, CA (Radar subcontractor to McDonnell).

E. COMPARISON WITH REVISED FY 1991 PRESIDENT'S BUDGET:

1. TECHNICAL CHANGES: Not applicable.
2. SCHEDULE CHANGES: Not applicable.
3. COST CHANGES: Not applicable.

F. PROGRAM DOCUMENTATION:
OR #199-05-88 promulgated - 27 Jan 88.

G. RELATED ACTIVITIES: P.E. 0205667N F-14D radar development is directly related to the AN/APG-65 upgrade with a hardware (SRA) commonality of 60%.

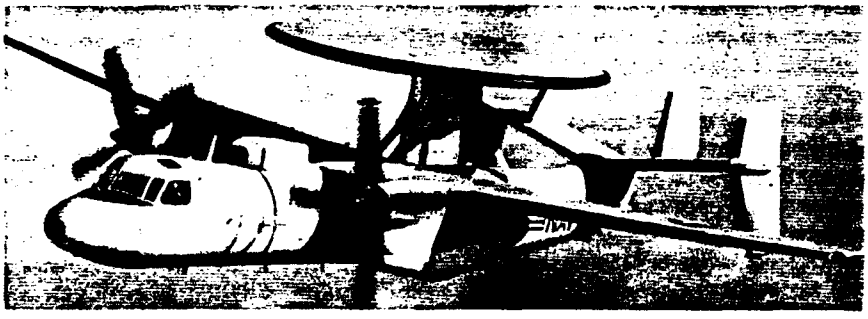
H. OTHER APPROPRIATION FUNDS: Not applicable.

I. INTERNATIONAL COOPERATIVE AGREEMENTS: Memorandum of Understanding signed by Canada on 30 March 1990 for cooperative development agreement. FY90 Canadian contribution $31.5M (total $38.5M). Nunn Amendment funding contribution $13.6M.

J. TEST AND EVALUAT[illegible]: See Congressional Data Sheets.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204152N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: EARLY WARNING AIRCRAFT SQUADRONS
PROJECT NUMBER: W0463 **PROJECT TITLE:** CV BASED AEW A/C - E-2C
POPULAR NAME: HAWKEYE



A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	TO COMPLETE
Program Milestones		UDP II LRIP/91-92		UDP II FRP/93	
Engineering Milestones					
T&E Milestones	UDP II DT-IIC	UDP II/DT-IID UDP II/OT-IID	UDP II/OPEVAL		
Contract Milestones					
BUDGET ($K)	**FY 1990**	**FY 1991**	**FY 1992**	**FY 1993**	**Program Total**
Major Contract	26,800	20,300	2,000	500	Continuing
Support Contract					
In-House Support	13,618	16,427	4,149	5,636	Continuing
GFE/ Other	200	200	200	200	Continuing
TOTAL	40,618	36,927	6,349	6,336	Continuing

PROGRAM ELEMENT: 0204152N BUDGET ACTIVITY:4
PROGRAM ELEMENT TITLE: EARLY WARNING AIRCRAFT SQUADRONS
PROJECT NUMBER: W0463 PROJECT TITLE: CV BASED AEW A/C - E-2C

B. (U) DESCRIPTION: The E-2C is an all-weather, carrier-based airborne early warning aircraft, with a crew of five. This weapon system extends the task force defense perimeter by providing early warning of approaching enemy units (surface and air), vectoring of interceptors into attack position, and providing air and surface situation data to other fleet elements. This program provides preplanned product improvements for the evolution of E-2C aircraft capability in support of naval warfare command and control requirements. It funds development for the modification/replacement of selected weapon replaceable assemblies of currently installed E-2C subsystems. These expanded capabilities will permit offensive weapon systems to be more effective in countering the tactical threat thus enhancing the Navy's warfighting capability. Included are two sub-projects: Update Development Program (UDP) Groups I and II. Group I modifications to the APS-138 radar will result in redesignation as APS-139. Improvements include improved surface detection in high sea state/clutter, improved counter-measures, and automatic channel monitor/selection capability. Modifications to the tactical program include increased active track capacity, display prioritization and new radar controls. Group II modifications to the APS-139, or combined Groups I and II modifications to the APS-138, result in redesignation as APS-145. Improvements include extended range and the environmental processor.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:
1. (U) FY 1990 Accomplishments:
   a. (U) Conducted Navy flight evaluation of Group II, DT-IIC.
2. (U) FY 1991 Program:
   a. (U) Commence DT-IID/DT-IIIA (TECHEVAL/BIS) of Group II.
   b. (U) Commence software ground and flight test evaluation, DT-IIE, for Group II.
3. (U) FY 1992 Plans:
   a. (U) Complete development testing for Group II.
   b. (U) Conduct operational evaluation for Group II.
4. (U) FY 1993 Plans:
   a. (U) Conduct follow-on T & E, Group II (OT-III).
5. (U) Program to Completion:
   a. (U) Conduct follow-on T & E, Group II (OT-IV) completion date 9/94.
   b. (U) Program completed.

PROGRAM ELEMENT: 0204152N BUDGET ACTIVITY:4
PROGRAM ELEMENT TITLE: EARLY WARNING AIRCRAFT SQUADRONS
PROJECT NUMBER: W0463 PROJECT TITLE: CV BASED AEW A/C - E-2C

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRTESTCEN, Patuxent River, MD; NRL, Washington, DC; FLTCOMBATDIRSSACT, San Diego, CA; NAVAIRDEVCEN, Warminster, PA. CONTRACTORS: Grumman Aerospace Corporation, Bethpage, NY; General Electric, Utica, NY.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not Applicable.

2. (U) Schedule Changes: Not Applicable.

3. (U) Cost Changes: Not Applicable.

F. (U) PROGRAM DOCUMENTATION:

OR 31-20	12/66
DCP (Rev 1)	6/71
NDCP W-0463-AA	4/88
TEMP 760 (Rev 4)	12/90

G. (U) RELATED ACTIVITIES: P.E. 0602232N, Command and Control Technology and P.E. 0602111N, AAW/ASUW Technology, for radar system improvements.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Millions)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT						
APN 1/6	51.6	38.8	44.7	53.8	0	256.8

(U) MILCON: Not applicable

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) TEST AND EVALUATION: This information is included in the FY 1992 Congressional Data Sheets.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204163N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Fleet Telecommunications (Tactical)
A. (U) RESOURCES: (DOLLARS IN THOUSANDS)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0661	COMBINATION RADIO	4,973	3,169	4,410	3,954	592	53,311
X0725	COMMUNICATION AUTOMATION	3,323	4,571	9,928	10,380	Cont.	
X2083	SHIPBOARD SINCGARS/VHF RELAY PALLET	3,370	3,948	1,417	3,965	3,825	16,525
X2074	COMM SUPPORT SYSTEM (CSS)	*0	**0	2,927	6,493	Cont.	
	TOTAL	11,666	11,688	18,682	24,792		

* Funded under PE 0303401N
** $1.2M has been funded in X0725

B. (U) DESCRIPTION: This program develops anti-jam radios, antennas, VHF Relay Pallets, high speed broadcast data transmission systems and intra-battle group networking. It provides for integration of Electronic Counter-counter Measures (ECCM) radios in Navy ships and develops an integrated Navy communication system architecture based on shared use of links and multimedia networks.

FY 1992/3 RDT&E, NAVY DESCRIPTION SUMMARY

PROGRAM ELEMENT: 0204163N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Fleet Telecommunications (Tactical)
PROJECT NUMBER: W0661 PROJECT TITLE: Combination Radio

C. (U) DESCRIPTION: This project develops airborne tactical anti-jam radio systems providing DOD/NATO interoperability. The AN/ARC-210 Electronic Counter Counter-Measures (ECCM) Combination Radio provides small, secure, jam resistant UHF/VHF communications utilizing HAVE QUICK I/II and Single Channel Ground and Airborne Radio System (SINCGARS) waveforms. It is planned to incorporate the Downed Aircrew Locating System (DALS) and HAVE QUICK IIA capabilities.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. (U) Completed AN/ARC-210 integration into F/A-18.
   b. (U) Started TECHEVAL for AN/ARC-210 ECCM Radio.
   c. (U) Completed AN/ARC-210 reliability development test.
   d. (U) Started AN/ARC-210 Helo integration.
2. (U) FY 1991 Program:
   a. (U) Complete AN/ARC-210 Helo Integration.
   b. (U) Conduct AN/ARC-210 Helo TECHEVAL and OPEVAL.
   c. (U) Conduct and complete AN/ARC-210 F/A-18 TECHEVAL and OPEVAL.
3. (U) FY 1992 Plans:
   a. (U) Obtain Milestone III production decision for AN/ARC-210.
   b. (U) Initiate incorporation of HQIIA capability into AN/ARC-210.
   c. (U) Initiate incorporation of DALS capability into AN/ARC-210.
4. (U) FY 1993 Plans:
   a. (U) Complete incorporation of HQIIA into AN/ARC-210.
   b. (U) Complete incorporation of DALS into AN/ARC-210.
   c. (U) Commence validation tests of DALS and HQIIA.
5. (U) Program to Completion:
   a. (U) Complete validation tests of DALS and HQIIIA. FY 1994 completes initial R&D phase of AN/ARC-210 Program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRDEVCEN, Warminster, PA; NAVAIRTESTCEN, Patuxent River, MD; NAVAVIONICCEN, Indianapolis, IN; NRL, Washington, DC. CONTRACTOR: Rockwell-Collins, Cedar Rapids, IA; McDonnell Aircraft Co., St. Louis, MO; Chelton Electrostatics, London, UK and MITRE.

F. (U) RELATED ACTIVITIES: Air Force HAVE QUICK/HAVE SYNC, Program Element 0207423F; Army SINCGARS, Program Element 0604805A.

G. (U) OTHER APPROPRIATION FUNDS: Applicable airframe appropriations that will have the AN/ARC-210 installed for future testing/production installation. Potential users include CH-53E, CH-46, UH-1N, F/A-18, T/AV-8B, AH-1W, EA-6B, KC-130F/R/T; Air Force F-16, A-10, B-52; AFSOC; Army ASC-15, ARSOC.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENT: None.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204163N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Fleet Telecommunications (Tactical)
PROJECT NUMBER: X0725 **PROJECT TITLE:** Communications Automation

A. (U) RESOURCES: (DOLLARS IN THOUSANDS)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X0725	COMMUNICATIONS AUTOMATION	3,323	4,571	9,928	10,380	Cont.	Cont.

B. (U) DESCRIPTION:
(U) Afloat Automated Network (AAN): This effort develops the provisions for high data rate message transfer within the Navy Modular Automated Communications System (NAVMACS). Phased development provides stand alone network for processing messages intra-battle group, with follow-on development to integrate the network onto NAVMACS.
(U) High Speed Fleet Broadcast (HSFB): Resolves long standing throughput and system flexibility shortcommings by replacing the existing Fleet Broadcast with a more efficient, volume responsive, broadcast.
(U) Navy Modular Communications System (NAVMACS): This effort develops a Mass Storage and Retrieval Improvement (MSRI) device to supplement existing capability and integrates a Personal Computer Local Area Network (PC-LAN) into the NAVMACS systems.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:

a. **(U) AAN:** Started feasibility design, development and documentation of network protocol and net control software.

b. **(U) HSFB:**
(1) Awarded Full Scale Development hardware contract.
(2) Started Full Scale Engineering Development (FSED).
(3) Started software modification for NAVCOMPARS.
(4) Started software integration testing.
(5) Procured EDM system to start testing.

2. (U) FY 1991 PLANS:

a. **(U) AAN:**
(1) Continue software feasibility development leading to demonstration & validation.

b. **(U) HSFB:**
(1) Continue FSED.
(2) Procure four additional EDM systems to continue testing toward OPEVAL.

c. **(U) CSS:** $1.2M - Details are listed under X2074

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204163N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Fleet Telecommunications (Tactical)
PROJECT NUMBER: X0725 PROJECT TITLE: Communications Automation

3. (U) FY 1992 PLANS:
   a. (U) AAN:
      (1) Continue software feasibility development Phase II, and conduct independent verification & validation.
      (2) Develop AAN capability on HF circuits and conduct integration/system checkout.
   b. (U) HSFB:
      (1) Conduct system engineering, testing and OPEVAL
      (2) Procure final eight EDM systems
   c. (U) NAVMACS:
      (1) NAVMACS/CSS Integration Planning (design & early development), testing and documentation
      (2) Procure MSRI Hardware for integration testing
      (3) PC-LAN integration planning for NAVMACS
      (4) Procure software/hardware upgrades for NAVMACS/CUDIXS
4. (U) FY 1993 PLANS:
   a. (U) AAN:
      (1) Continue software feasibility development.
      (2) Continue integration sheckout of system functional capabilities, ship-to-ship HF checkout, verification and documentation.
   b. (U) HSFB:
      (1) Continue system engineering/testing, & OPEVAL.
   c. (U) NAVMACS:
      (1) Continue NAVMACS/CSS integration Planning,testing and documentation.
      (2) MSRI integration, testing and documentation.
      (3) Continue PC-LAN integration, testing, documentation, and training.
      (4) Procure software/hardware upgrades for NAVMACS/CUDIXS.
5. (U) PROGRAM TO COMPLETION:
   a. (U) AAN:
      (1) Continue software development and IV&V, continue system checkout, integration/testing, and documentation; Implementation fleet-wide.
   b. (U) HSFB:
      (1) Complete system engineering and testing.
      (2) Conduct DT/OT III if necessary.
      (3) Implementation of HSFB throughout the fleet.
   c. (U) NAVMACS:
      (1) Complete MSRI and PC-LAN Development, continue NAVMACS/CSS integration, testing & implementation.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204163N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Fleet Telecommunications (Tactical)
PROJECT NUMBER: X0725 PROJECT TITLE: Communications Automation

D. (U) WORK PERFORMED BY: IN-HOUSE: COMSPAWARSYSCOM, Washington,D.C.; NESEC Portsmouth,VA. CONTRACTORS: UNISYS, St. paul, MN; SEMCOR, Arlington, VA.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. TECHNOLOGY CHANGES: Program has been expanded to include the development of HSFB and AAN.
2. SCHEDULE CHANGES: Schedule has been modified to include HSFB and AAN.
3. COST CHANGES: Additional funds, $2,430K have been added to the program to accomplish the development of HSFB and AAN.

F. (U) PROGRAM DOCUMENTATION:
1. AAN: CNO ltr Ser 941H/7U338258 dtd 22 OCT 87
2. HSFB:OR # 237-94-89 CNO 5 JAN 89 and CNO LTR Ser 941H/9U537054 dtd 23 JAN 89
3. NAVMACS: OR - CC72 dtd 24 JUN 75 and, CNO ltr Ser 941H/7U338258 dtd 22 OCT 87

G. (U) RELATED ACTIVITIES: None.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 TO ESTIMATE	TO COMPLETE	TOTAL PROGRAM
PROCUREMENT OPN #127	2,431	5,593	8,357	11,818	Cont.	
SCN	0	1,000	1,000	1,000	Cont.	

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

J. (U) MILESTONE SCHEDULE:
1. AAN: Follow on contract FY 1991 (includes SCN funding).
Phase I - FY 1991
Phase II- FY 1992

2. HSFB: MS III first quarter FY 1994.

3. NAVMACS: Model II concept FY 1992.

UNCLASSIFIED

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY
PROGRAM ELEMENT: 0204163N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Fleet Telecommunications (Tactical)
PROJECT NUMBER: X2083 PROJECT TITLE: SHIPBOARD SINCGARS/VHF RELAY SEGMENT

C. (U) DESCRIPTION: This project will provide VHF(FM) jam resistant communications and Digital Communications Terminals (DCTs) for Naval Surface Fire Support and Amphibious Ships, and a VHF relay segment. Shipboard SINCGARS is based on a Non-Development Item (NDI) radio. This project will develop interference mitigation and interface equipment. Other appropriation funds also provides for replacement of installed Navy Shipboard VRC-46 radios not replaced by Shipboard SINCGARS with a new VHF(FM) radio.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:
   a. (U) Completed shipboard SINCGARS EMI analysis/programmatic documentation package for SINCGARS.
2. (U) FY 1991 PLANS:
   a. (U) Conduct Airborne Relay Preliminary Design Review.
   b. (U) Continue Navy FSD development of single channel Shipboard SINCGARS Segment (SSS).
3. (U) FY 1992 PLANS:
   a. (U) Conduct Airborne Relay Critical Design Review (CDR).
   b. (U) Conduct single channel SSS System Design Review.
4. (U) FY 1993 PLANS:
   a. (U) Conduct single channel SSS Preliminary Design Review.
   b. (U) Issue RFP for three channel SSS.
5. (U) PROGRAM TO COMPLETION:
   a. (U) Commence DT on Airborne Relay EDMS.
   b. (U) Conduct single channel SSS CDR.
   c. (U) Award FSD Contract for three channel SSS.
   d. (U) Conduct TECHEVAL/OPEVAL on single channel SSS and Airborne Relay.
   e. (U) Begin procurement of single channel SSS and Airborne Relay.
   f. (U) Conduct TECHEVAL/OPEVAL for the three channel SSS.
   g. (U) Begin procurement of the three channel SSS.

E. (U) WORK PERFORMED BY:
IN-HOUSE: NAVAVIONICCEN, Indianapolis, IN; NRL, Washington, DC; NAVELEXSYSENGACT, St. Inigoes, MD; NAVELEXCEN, Portsmouth, VA;
CONTRACTOR: VITRO Corporation, Silver Spring, MD; RS Data Systems, Washington, DC; MITRE Corporation, McLean, VA; TBD FSED Contractor

F. (U) RELATED ACTIVITIES:
Air Force HAVE QUICK/HAVE SYNC, Program Element 0207423; Army SINCGARS, Program Element 0604805A; Navy AN/ARC-210 Combination Radio 0204163N

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY1990 ACTUAL	FY1991 ACTUAL	FY1992 ACTUAL	FY1993 ACTUAL	TO COMPLETE	TOTAL PROGRAM
OPN	0	0	0	997	102426	103423
O&M,N	0	0	0	0	4534	4534

H. (U) INTERNATIONAL COOPERATIVE AGREEMENT: None

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY
PROGRAM ELEMENT: 0204163N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Fleet Telecommunications (Tactical)
PROJECT NUMBER: X2074 PROJECT TITLE: Communications Support System (CSS)

C. (U) **DESCRIPTION:** This project is an initiative to develop an integrated Navy communication system architecture based on shared use of links and multimedia networks. It will provide increased communication survivability, throughput and security. CSS will further integrate the approach to research, development, acquisition and deployment of a total C3I system supporting Navy missions. The work to be performed is a system engineering effort that generates engineering solutions and guidelines, prototyping and fleet demostrations, and transition plans involving all current and planned Navy Communication systems.

D. (U) **PROGRAM ACCOMPLISHMENTS AND PLANS:**

1. (U) **FY 1990 ACCOMPLISHMENTS:** (Funded under PE 0303401N)
   a. (U) Developed CSS preliminary specifications
   b. (U) Commenced CSS simulation test bed and performed initial simulation of CSS protocols
   c. (U) Commenced dev. of specifications for security design
2. (U) **FY 1991 PROGRAM:** (Funded under Project X0725)
   a. (U) Develop detailed transition plan
   b. (U) Provide CSS spec rqmts for EHF-IXS development
   c. (U) Provide CSS spec rqmts for TACINTEL II development
   d. (U) Perform CSS simulations to evaluate system performance
   e. (U) Complete specifications for CSS security design
   f. (U) Develop Modular Security Device
   g. (U) Defined requirements for CSS emulation testing
3. (U) **FY 1992 PLANS:**
   a. (U) Protopype Multimedia Controller
   b. (U) Demonstrate Single Channel Multimedia OTH-IXS
   c. (U) Demo. Dynamic Internetting of HF and UHF/LOS Data Links
4. (U) **FY 1993 PLANS:**
   a. (U) Demonstrate Mission Area Subnets
   b. (U) Develop prototype Phase I CSS Fleet Implementation
   c. (U) Initiate planning for CSS Fleet demonstration
   d. (U) Fleet demonstration of CSS implementation
   e. (U) Initiate AICS implementation studies
5. (U) **PROGRAM TO COMPLETION:** This is a continuing program
   a. (U) Demo. NTDS Interface and Full Multimedia Selection
   b. (U) Add'l. fleet demonstration of CSS Implementation

E. (U) **WORK PERFORMED BY: IN-HOUSE:** NOSC, San Diego, C.; **CONTRACTOR(S):** Harris Corp., Melborne, Fl.

F. (U) **RELATED ACTIVITIES:** Unified Network Technology (UNT), Shared Adaptive Internet Technology (SAINT), Communications Shared Network Interface (CSNI) (Nato), NESP, TACINTEL, HSFB, C2P, JTIDS, COMSEC, Link 11 and Link 16.

G. (U) **OTHER APPROPRIATION FUNDS:** (Dollars in Thousands)
This is a non-acquisition program.

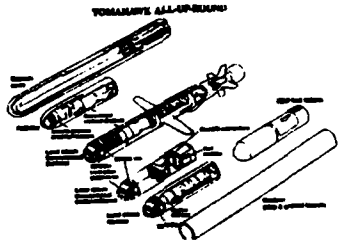
H. (U) **INTERNATIONAL COOPERATIVE AGREEMENTS:** None **UNCLASSIFIED**

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0204229N Budget Activity: 4

Program Element Title: SURF. COMB ORD/MISSILE-TOMAHAWK

Program Number: W0545 Project Title: TOMAHAWK



POPULAR NAME: TOMAHAWK Cruise Missile

A. (U) SCHEDULE/BUDGET INFORMATION: (dollars in thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	To Complete
Program	IOC Flex-Blk 3	MS 3A Blk 3	MS 3B	IOC Blk 3	MS 3 Blk IV Milestones
Ship	(Jan)	Ship (Jul)	(Feb)	(4th Qtr 95)	(May)
		Sub MS 3B TLAM/D (Jan)	MS 2/3 Blk 5 MS 2 Blk 4 (Mar)	IOC Sub Flex (May)	(4th Qtr 97)
Engineering Milestones	DES Rev. Blk 3			DES Rev. Blk 4	DES Rev Blk 5
T&E Milestones	FOT&E Flex	DT/OT Blk 3	FOT&E Blk 3		DT/OT Blk 4 Blk 5
Contract Milestones	Flex Blk 3 VLS Int. ISNSA	Flex Blk 3 VLS Int. ISNSA	Flex, Blk 3, Blk 4 VLS Int. ISNSA	Flex, Blk 3 Blk 4 VLS Int ISNSA	Blk 4 Blk 5 VLS Int. ISNSA

BUDGET ($K)	FY 1990	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL
Major Contract	12,240	10,937	8,950	10,730	Continuing
Support Contract					
In-House Support	19,097	22,361	19,478	14,887	Continuing
GFE/Other					
Total	31,337	33,298	28,428	25,617	Continuing

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0204229N Budget Activity: 4
Program Element Title: SURF. COMB ORD/MISSILE-TOMAHAWK
Program Number: W0545 Project Title: TOMAHAWK

B. (U) DESCRIPTION: The TOMAHAWK Cruise Missile provides an attack capability against targets at sea (TOMAHAWK Anti-ship Missile) and on land (TOMAHAWK Land-Attack Missile). The Land-Attack missile can be fitted with either conventional unitary warhead (TLAM/C), nuclear warhead (TLAM/N) or submunition dispenser (TLAM/D).

The TOMAHAWK anti-ship mission is to destroy seaborne targets at stand-off ranges and complement U.S. aircraft war-at-sea strikes against combatant ships. The Tomahawk conventional land attack mission is to destroy naval targets ashore; fleet command, control and logistic systems; industrial or other high value targets; and ground based air defense systems. The TOMAHAWK nuclear land attack mission is to provide a highly survivable, world-wide theater nuclear capability. TOMAHAWK cruise missiles are capable of being launched from a variety of submarine and surface platforms. TOMAHAWK does not replace any existing weapon system, but instead, complements and increases the survivability of carrier battle group strike capacity at sea and ashore while expanding U.S. Navy offensive capability to units other than the aircraft carriers.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. (U) Continued the development engineering of TLAM/C/D Block III, TWCS Block III, Submarine Flexible Targeting, Vertical Launch System (VLS) Integration, and Independent Software Nuclear Safety Analysis (ISNSA).
   b. (U) Completed the development of Ship Flexible Targeting.

2. (U) FY 1991 Program:
   a. (U) Continue the development engineering of TLAM Block III (both variants TLAM/C and /D).
   b. (U) Begin Block III full system operational testing leading to limited then full production decisions. This testing includes at-sea flight tests.
   c. (U) Continue development of TWCS Block III, VLS integration, Submarine Flexible Targeting, Advance Systems Engineering, and ISNSA.

3. (U) FY 1992 Plans:
   a. (U) Continue engineering development of TLAM Block III Flex Targeting (sub); Tomahawk Weapons System (TWS) Block IV to provide improved digital TLAM-N Flex Targeting; TLAM-C Flex; Over-the-Horizon (OTH)-

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0204229N Budget Activity: 4
Program Element Title: SURF. COMB ORD/MISSILE-TOMAHAWK
Program Number: W0545 Project Title: TOMAHAWK

Tomahawk capability encompassing improved communications, sensors, interfaces and database processes; software development automate/embed target, tactical and training algorithms; and Operational Flight Simulation (OFS)/TLAM upgrade development.

b.(U) Development research efforts to identify sources of new target data.

c.(U) Continue VLS integration, ISNSA, and Advance System Engineering development.

4. (U) FY 1993 Plans:

a.(U) Complete Development of TLAM Block III for ship/sub and Flex Targeting for sub.

b.(U) Continue TWS Block IV, ISNSA, VLS integration and advanced systems engineering development.

5. (U) Program to Completion:

a.(U) Complete TLAM Block III sub; TWS Block IV; initiate and complete TLAM Block V to provide systems integration of Tomahawk and other target sources; and continue ISNSA, VLS integration and Advance Systems Engineering.

D. (U) WORK PERFORMED BY:

IN-HOUSE: NAVWPNCEN, China Lake, CA; NUSC, Newport RI; NAVSWC, Dahlgren, VA; PACMISTESTCEN, Pt. Mugu, CA; NAVSHIPWPNSYSENGSTA, Port Hueneme, CA; NAVAVIONICCEN, Indianapolis, IN; NAVOCEANSYSCEN, San Diego, CA.
Contractors: McDonnell Douglas Missiles System Company, St. Louis, MO; General Dynamics/Convair, San Diego, CA; Logicon, San Pedro, CA; Tiburon System Inc., San Jose, CA; General Dynamics/Electronics, San Diego, CA.

E. (U) COMPARISON WITH REVISED FY 1991 PRESIDENT'S BUDGET:

1. (U) TECHNICAL CHANGES: None.

2. (U) SCHEDULE CHANGES: None.

3. (U) COST CHANGES: None.

F. (U) PROGRAM DOCUMENTATION:

	TOR	DOP	OR	NDCP	TEMP
TOMAHAWK Missile (All-up Round)	N/A	N/A	N/A	12/90	11/90
TOMAHAWK Launch platforms	N/A	N/A	N/A	12/90	11/90

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0204229N Budget Activity: 4
Program Element Title: SURF. COMB ORD/MISSILE-TOMAHAWK
Program Number: W0545 Project Title: TOMAHAWK

G. (U) RELATED ACTIVITIES:
Program Element 0604367N (Theater Mission Planning Center)
Program Element 0604707N (Over-The-Horizon Targeting)
Program Element 0604370N (SSN-688 Vertical Launch)

H. (U) OTHER APPROPRIATION FUNDS: (Dollar in Thousands)

APPN/P-1	FY 1990 Actual	FY 1991 Estimate	FY 1992 Estimate	FY 1993 Estimate	To Complete	To Program
WPN/#6,7	575,289	658,603	454,123	394,217	Cont.	Cont.
OPN/#224	40,542	24,277	53,533	70,849	Cont.	Cont.
OPN/#225	5,990	2,339	3,397	3,437	Cont.	Cont.
MILCON	4,600	11,229	10,580	22,050	Cont.	Cont.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204311N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Undersea Surveillance Systems
PROJECT NUMBER: X0766 PROJECT TITLE: Integrated Undersea Surveillance (IUSS) Development

POPULAR NAME: IUSS

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	To Complete
Program Milestones					MSII SOSUS PHASE III 2QFY94
	MSII LFA 6/90		MSIIIA LFA 11/92	MSII 4Q96 SDS	
Engineering Milestones					
			SRR SDS 1Q92		CDR SOSUS PHASE III 4QFY95
		SDR LFA LTS 11/90	PDR LFA ARS 12/91	PDR SDS 3Q93	CDR SDS 1Q94
		PDR LFA LTS 02/91	SDR SDS 3Q92		
	CDR RDA 8/90	CDR LFA LTS 05/91	SSR SDS 4Q92	FSP DEMO 6/93	
		SDR LFA ARS 6/91	CDR LFA 6/92		
T&E Milestones					
	OTI LFA 12/89				DT II/OT II SOSUS PHASE III 2QFY97
		LFA LTS Endurance Test 7/91	DT/OTIIA LFA 9/92		
			LTS Mini-SYSTEM LFA 11/91		DT/OT IIB LFA 3Q95
Contract Milestones					
		Award LFA LTS 10/90			SOSUS PHASE III FSED
	Award LFA ARS 8/90			Exercise SDS Devel Option 3Q93	1QFY95
		Award SDS Design 4Q91			SDS FSED CONT 1Q97

PROGRAM ELEMENT: 0204311N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Undersea Surveillance Systems
PROJECT NUMBER: X0766 PROJECT TITLE: Integrated Undersea Surveillance (IUSS) Development

BUDGET (SK)	FY 1990	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL TO COMPLETE
Major Contract	34,448	39,347	61,574	60,664	Cont.
Support Contract	2,761	3,321	4,419	4,702	Cont.
In-House Support	6,344	3,496	6,390	7,590	Cont.
GFE/ Other	154	276	211	215	Cont.
Total	43,707	46,440	72,594	73,171	Cont.

B. (U) DESCRIPTION: IUSS provides the majority of the U.S. Navy's open

This program provides for the design and development of the shore-based acoustic signal processing system; the intra-system acoustic and data handling/transmission systems; the underwater electronic and cable technology to improve IUSS performance;

SURTASS Reduced Diameter Array (RDA) (RDA will transfer to Program Element 0204313N in FY 92) tasks.

The requirements to

The following capabilities will be incorporated:

The SURTASS LFA program will provide an capability for IUSS passive sensors, and is developing for the SURTASS TAGOS (SWATH A) platform. The program will also provide for

SURTASS LFA program components are: (1) TAGOS 23 class SWATH platform; (2) low frequency high power source array; (3) receive processing subsystem to perform detection, classification and reporting aboard the SWATH ship; and (4) reduced diameter SURTASS receive array.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:

a. (U) Commenced developmental program for SOSUS to traditional signals (transients, speed dependents, active), special projects, reduce personnel requirements at sites.

b. (U) Initiated SDS baseline program; acquisition plan approved.

c. (U) Conducted Operational Test I (OTI) (Nov 1989) onboard the LFA Advanced Development Model (ADM) platform. Results of this and previous

PROGRAM ELEMENT: 0204311N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Undersea Surveillance Systems
PROJECT NUMBER: X0766 PROJECT TITLE: Integrated Undersea Surveillance (IUSS) Development

Development Testing (DT) indicated that no major technical problems were observed; approved MS II; awarded LFA FSED contract for

d. (U) Conducted RDA critical design review, continued fabrication and in-plant testing of RDA EDM, and began fabrication of RDA modules for second source qualification.

2. (U) FY 1991 PROGRAM:

a. (U) Continue FY 90 program. Deploy system for evaluation with focus on operator aids to classification. Begin equipment design to provide capability for cable ships to install fiber optic cables.

b. (U) SDS request for proposals (RFP) Second Quarter FY 1991. Competitively award SDS Design Contract in Fourth Quarter; commence design of SDS

c. (U) Deliver RDA EDM and conduct array subsystem tests.

d. (U) Award fixed price contract for LFA FSED Low Frequency Transmit Subsystem.

3. (U) FY 1992 PLANS:

a. (U) Continue program by adding at two evaluation sites, initiate work in automatic classification of signals. Continue design effort for and individual cable ship design details.

b. (U) Continue SDS design: Conduct System Requirements Review (SRR) First Quarter; conduct System Design Review (SDR) Third Quarter; conduct System Specification Review (SSR) Fourth Quarter; continue SDS design and SDS Operational Development Center installation.

c. (U) Conduct LFA Preliminary and Critical Design Reviews; continue LFA full-scale engineering development (FSED) contract; deliver and install EDM LFA Transmit and RDA subsystem on board the R/V Cory Chouest.

4. (U) FY 1993 PLANS:

a. (U) Continue program by incorporating all-source automatic detectors in the two prototype systems and refining and improving the automatic classification by combining information from traditional signals. Develop specifications for a processing architecture which will support real time automatic detection, classification, tracking and reporting using all Continue updates to cable ships.

b. (U) Continue SDS design; conduct Preliminary Design Review (PDR) Third Quarter; award SDS development contract option, Third Quarter; continue SDS Operational Development Center.

c. (U) Continue development of LFA FSED contract.

d. (U) Complete MSIIIA LFA

5. (U) PROGRAM TO COMPLETION:

a. (U) The results of FY 92/93 demonstrations of the prototype system will be incorportated into a full scale

PROGRAM ELEMENT: 0204311N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Undersea Surveillance Systems
PROJECT NUMBER: X0766 PROJECT TITLE: Integrated Undersea Surveillance (IUSS) Dev

engineering development. The SOSUS Phase III system will be designed and developed by a competitively selected contractor and fielded in all SOSUS NAVFACs.

b. (U) Continue SDS ADM development, install interim communications support subsystem to support Fixed Distributed System(FDS)(ACAT 1), conduct Critical Design Review (CDR) First Quarter 94; support FDS-1 TECHEVAL/OPEVAL with interim communications support subsystems. Complete SDS Milestone II during Fourth Quarter FY 1996.

c. (U) Complete LFA software development and conduct Joint Test Group testing of LFA receive processing (FY94); conduct OPEVAL, complete low rate production; complete MSIIIB; and commence production of LFA system (FY96); LFA IOC (FY95).

d. (U) This is a continuing program.

D. (U) WORK PERFORMED BY: In-House: NOSC, San Diego, CA; NCEL, Port Heuneme, CA; NRL, Wash DC; NESEA, St Inigoes, MD. Contractors: Hughes Aircraft Co., Buena Park, CA; APL/JHU, Laurel, MD; AT&T Technologies Inc., Greensboro, NC; ARL Univ of Texas, Austin, Texas; Lockheed Sanders Inc., Manchester, NH.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET

1. (U) Technology Changes: Not applicable.
2. (U) Schedule Changes: Not applicable.
3. (U) Cost Changes: None.

F. (U) PROGRAM DOCUMENTATION:

NDCP #78	28 Jan 1980
Milestone I Decision	13 May 1986
Navy Decision Coordination Paper (NDCP)	13 May 1986
Test and Evaluation Master Plan (TEMP)	25 Aug 1986
AP 89-22 (SOSUS) (Revision in Process)	7 Aug 1989
OR 246-02-89 (SDS)	5 Jun 1989
AP 89-1 (SDS)	25 May 1990
AP Update 89-1-1 (SDS)	In Process
AP 86-16 (RDA)	27 Oct 1986
OR 038-95-88	5 Jul 1985
LFA AP 88-3	28 Jun 1989
LFA TEMP 1214	7 Nov 1989
DCP T-AGOS-23 SWATH A	22 Aug 1989
DCP 137 Rev 1 for SURTASS Improvements(incl LFA)	20 Feb 1990
LFA ILS Plan	Est Mar 1991
LFA Naval Training Plan	Est Mar 1991

G. (U) RELATED ACTIVITIES: PE 0604784N, Fixed Distributed System (FDS); PE 0204313N, Surveillance Towed Array Sensor (SURTASS) System; PE 0603747N, Advanced ASW Technology Demonstration.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands) Not Applicable

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL
(U) PROCUREMENT						
SCN #20	182,756	0	0	148,200	Cont.	Cont.
OPN #65	20,538	39,493	78,153	89,059	Cont.	Cont.
OPN #70	14,749	2,827	31,051	47,693	Cont.	Cont.

(U) MILCON Not applicable

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable

J. (U) TEST AND EVALUATION: Not Applicable

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204313N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surveillance Towed Array Sensor System (SURTASS)
PROJECT NUMBER: X0758 PROJECT TITLE: SURTASS

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X0758	SURTASS	8,651	5,774	17,622	15,141	Cont.	Cont.

B. (U) DESCRIPTION: The Surveillance Towed Array Sensor System (SURTASS) provides a mobile, long range, passive undersea surveillance capability against current and projected threat submarines. SURTASS also provides flexibility in expanding present undersea surveillance operations supporting tactical Anti-Submarine Warfare (ASW) forces. The SURTASS Block Upgrade and Reduced Diameter Array (RDA) which will transfer from Program Element 0204311N in FY 92) provides improved detection and classification capability to SURTASS . It includes additional signal processing to improve

Additional upgrades will provide for capability for T-AGOS 1 class (monohulls) and T-AGOS 19 (SWATH-P) class; exploiting improved shipboard detection, classification and tracking capability to support Battle Group operations in a communications denied environment; improved information processing systems to process greater quantities of increasingly complex data without increasing manpower or communications bandwidth; training and testing operators under realistic operational scenarios to ensure operator proficiency in the changing threat environment; the integration of SURTASS with emergent IUSS sensors; and the required conversion from Enhanced Modular Signal Processor (EMSP) SEM B to SEM E.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. (U) Continued Block Upgrade software code and test.

2. (U) FY 1991 Program:
   a. (U) Continue Block Upgrade software code and test.

3. (U) FY 1992 Plans:
   a. (U) Conduct TECHEVAL and OPEVAL on SURTASS Block Upgrade and Reduced Diameter Array.

PROGRAM ELEMENT: 0204313N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surveillance Towed Array Sensor System (SURTASS)
PROJECT NUMBER: X0758 PROJECT TITLE: SURTASS

b. (U) Begin integration of
c. (U) Begin development of
Operational Readiness Inspection (ORI) Upgrade to provide an interactive target scenario generator, and
to provide enhanced detection capability against

d. (U) Begin software conversion from EMSP SEM B to EMSP SEM E.

4. (U) FY 1993 Plans:
a. (U) Achieve Milestone III for SURTASS Block Upgrade (including the Reduced Diameter Array) on T-AGOS 21.
b. (U) Continue development of ,ORI Upgrade, ,and EMSP SEM B to SEM E conversion.
c. (U) Begin concept definition phase of an Enhanced Shipboard Capability to provide more effective SURTASS Battle Group support in a hostile EM environment.

5. (U) Program to completion:
a. (U) Complete development of ORI Upgrade.
b. (U) Complete conversion of software from EMSP SEM B to EMSP SEM E.
c. (U) Complete development of
and Enhanced Shipboard Capability Upgrade.
d. (U) Begin requirements definition and complete development for integration of SURTASS into Surveillance Direction Systems (SDS), an Information Processing Systems Upgrade to improve detection capability, and a Reduced Diameter Array (RDA) Upgrade to improve array performance by incorporating fiber optic technology.
e. (U) Initiate and complete other upgrades as required to ensure continued SURTASS effectiveness in the threat environment of the year 2000.

D. (U) WORK PERFORMED BY: In-House: NOSC, San Diego, CA.
Contractors: Hughes Aircraft Company, Fullerton, CA.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET

1. (U) Technology Changes: None

2. (U) Schedule Changes: None

3. (U) Cost Changes: None

PROGRAM ELEMENT: 0204313N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surveillance Towed Array Sensor System (SURTASS)
PROJECT NUMBER: X0758 PROJECT TITLE: SURTASS

F. (U) PROGRAM DOCUMENTATION:

DCP 137	02/20/1990
TEMP 164-1 (REV 1) (SURTASS BLOCK UPGRADE)	EST 04/91
TEMP 1214 (REV 1) (LFA)	EST 04/91
AP 87-11 (SURTASS)	12/22/1987

G. (U) RELATED ACTIVITIES: PE 0204311N, Undersea Surveillance System - Provides the Reduced Diameter Array (RDA) portion of the SURTASS Block Upgrade in FY 90 and 91, Low Frequency Active (LFA) development, and Surveillance Direction Systems (SDS) development; PE 0603785N, ASW Environmental Acoustic Support (AEAS) - provides acoustic data and modeling support and testing of modified arrays.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT						
SCN #20	182,756	0	0	148,200	CONT.	CONT.
OPN #70	14,749	2,827	31,051	47,693	CONT.	CONT.
(U) MILCON		22,531	2,650	26,478		

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: N/A

J. (U) MILESTONE SCHEDULE:

Block Upgrade MS II	FY 1986
Block Upgrade TECHEVAL/OPEVAL	FY 1992
Block Upgrade IOC	FY 1993
Operational Readiness Upgrade IOC	
EMSP SEM B to SEM E Conversion Upgrade	

FY 1992/93 ROTEE NAVY DESCRIPTION SUMMARY

PROGRAM ELEMENT: 0204413N BUDGET ACTIVITY:4
PROGRAM ELEMENT TITLE: Amphibious Tactical Support Units
PROJECT NUMBER: S1980 PROJECT TITLE: Amphibious Over-the-Horizon (OTH) Command and Control

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1980	OTHNC2	0	4,078	3,400	3,366	3,317	14,161

B. (U) DESCRIPTION: This project integrates existing developments into a system which will support the command and control of surface amphibious assaults launched from extended over-the-horizon (OTH) off shore ranges. The system adapts the USMC's Position Location Reporting System (PLRS) for naval applications and integrates it with navigation and communications systems. The project is required to effectively use the capabilities provided by deployment of the Landing Craft Air Cushioned (LCAC) vehicles. (New Start FY 1991)

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: N/A New Start FY 1991
2. (U) FY 1991 Plans:

Continue studies and analyses to validate the system technical approach and concept of employment. Develop airborne relay platform (ARP) and Global Positioning System Interface Unit (GPSIU) engineering development models and conduct tests to validate design and ensure responsiveness to requirements. Develop appropriate programs and interfaces to host Primary Control Subsystem in a standard USN computer; develop PLRS software changes necessary to support Primary Control Ship (PCS) data transfer requirements; acquire PCS engineering development hardware. Review and update Test and Evaluation Master Plan (TEMP). Develop maintenance, training and logistics plans; survey potential test platforms and prepare installation control documentation.

3. (U) FY 1992 Plans:

Perform tests to evaluate subsystem design and to validate subsystem interfaces; modify subsystem prototypes as appropriate. Continue maintenance, training, logistics planning and development of ARP. Prepare detailed test plans for DT-II (Techeval); arrange for ship and aircraft platforms.

4. (U) FY 1993 Plans:

Continue software development effort, review and update maintenance, training, and logistics documentation and accomplish DT-II/OT-II (Techeval/Opeval).

5. (U) Program to Completion:

Complete software development effort, conduct DT-III to validate suitability of new software, support OT-III and Milestone III review, and projected program completion is 9/94.

D. (U) WORK PERFORMED BY: IN-HOUSE: NADC Warminster, PA; NCSC Panama City, FL; MCTSSA Camp Pendleton, CA; NAC Indianapolis, IN; NOSC San Diego, CA; NAVELEX Vallejo, CA. CONTRACTORS: None

E. (U) RELATED ACTIVITIES: PE 0206626M (PLRS); PE 0603260N (GPS); PE 0204163N (Single Channel Ground and Airborne Radio System (SINCGARS)).

F. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
OPN LI0670	0	0	0	0	47,100	47,100

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204571N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Special Projects

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0431	Tactical Aircrew Combat Training System (TACTS)	6,692	3,896	8,457	8,408	Cont.	Cont.
X1823	Enhancement Naval Warfare Gaming System (ENWGS)	-0-	2,152	2,221	2,278	-0-	27,055
W1998	Tactical Combat Training System (TCTS)	-0-	-0-	7,699	9,904	Cont.	Cont.
TOTAL		6,692	6,048	18,377	20,590	Cont.	Cont.

B. (U) DESCRIPTION: This program develops instrumentation systems to support fleet training and tactics assessment. Specifically, it develops the Tactical Aircrew Combat Training System (TACTS), the Tactical Combat Training System (TCTS), and the Enhance Naval Warfare Gaming System (ENWGS). The TACTS provides real-time monitoring and post-exercise debrief of aircrews flying on instrumented training ranges. Through it's use of computer simulations, it provides aircrew training in weapons and countermeasures employment and tactics development in multiple warfare areas including air-to-air, air-to-surface, power projection, and defense suppression. This system is a primary training tool used by the Navy's "Top Gun" Fighter Weapons School and its attack counterpart, the Naval Strike Warfare Center, as well as the Marine's Weapons and Tactics Instructors course. TCTS will develop fleet deployable instrumentation for at sea surface, subsurface, and air training and tactics development. TCTS will accomodate single unit training through large area battle group evolutions. It will provide real-time, accurate feedback for tactics assessment and force employment. The system will generate Electronic Warfare (EW) and weapons simulation/stimulation and paired engagement scoring. It will support simultaneous simulated and actual battle group/aggressor units and simulated live fire interaction. It will include large screen debriefing displays. The program includes development of near term interim capabilities coordinated with Mobile Sea Range (MSR) during FY-92 to FY-95. ENWGS is a distributed tactical training system located at Tactical Training Group Atlantic, Tactical Training Group Pacific, Naval War College, CINCPACFLT, NAVPGSCOL and CINCUSNAVEUR. The ENWGS provides predeployment Battle Group-level training for senior Naval Officers and their staffs, and supports the Tactical Warfare Training Curriculum at the Tactical Training Groups. This system optimizes Battle Group/Battle Force training and supports Fleet training objectives independent of Force Structure. These capabilities are not available in any other system.

PROGRAM ELEMENT: 0204571N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Special Projects
PROJECT NUMBER: W0431 PROJECT TITLE: Tactical Aircrew Combat Training Sys

C. (U) DESCRIPTION: This project develops new TACTS capabilities primarily through the integration of additional weapons and aircraft types. This requires development of new aircraft interfaces, weapons and countermeasures simulations, and modifications to displays. Software is also developed to integrate Electronic Warfare (EW) threat emitters and produce computer generated EW threats to enhance the system's ability to provide training in a realistic EW environment. Various other system performance improvements are also developed to make the system more effective.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

a. (U) Completed the expansion of the Fallon TACTS range.

b. (U) Completed integration of several surface-to-air, rocket, gun, threat air-to-air weapon simulations.

c. (U) Completed TECHEVAL and OPEVAL for the Airborne Instrumentation Subsystem Internal (AISI).

2. (U) FY 1991 Program:

a. (U) Continue development of pod encryption capability; upgrade of the Control and Computational Subsystem (CCS); integration of the Orange Command and Control (OCC) system, High-speed Anti Radiation Missile (HARM), and F-14D; and correction of software problems.

b. (U) Complete integration of the Phoenix missile simulation and obtain approval for full rate production of the AISI.

3. (U) FY 1992 Plans:

a. (U) Complete the upgrade of the CCS, preliminary integration of the OCC system, and integration of the F-14D.

b. (U) Continue development of pod encryption capability; integration of AV-8B, EA-6B, Harpoon, HARM, Advanced Medium Air-to-Air Missile (AMRAAM), Heads Up Display/Digital Display Indicator (HUD/DDI) display, counter measures effects, pseudo threat uplink, and Link-11; and correction of software problems and implementation of software enhancements.

4. (U) FY 1993 Plans:

a. (U) Continue the integration of additional weapons and aircraft and the correction of software problems.

5. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRTESTCEN, Patuxent River, MD; NAVAIRDEVCEN, Warminster, PA; NAVWPNCEN, China Lake, CA; NWACC CORONA, Corona, CA. CONTRACTORS: Cubic Defense Systems, San Diego, CA; Loral, Sunnyvale, CA; FAAC, Ann Arbor, MI; Hughes Aircraft, Los Angeles, CA; Loral Conic, San Diego, CA

F. (U) RELATED ACTIVITIES: TACTS is a dual service program with the USAF, as defined by memorandum of agreement. Development of capabilities of common interest are jointly funded under the management of a lead service. The lead service is agreed to on a project by project basis.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT:						
APN/P-1 #69	$7,270	$6,937	$10,733	$15,747	Cont.	Cont.
OPN/P-1 #188	$12,615	$8,327	$13,288	$16,238	Cont.	Cont.
(U) MILCON:	-0-	-0-	-0-	-0-		

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204571N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Special Projects
PROJECT NUMBER: X1823 **PROJECT TITLE:** Enhanced Naval Warfare Gaming System (ENWGS)

C. (U) **DESCRIPTION:** The ENWGS will provide realistic battle group-level training for senior naval officers and their staffs, and will support the tactical warfare training curriculum at the Tactical Training Groups. As an operational and educational tool, ENWGS will focus on tactical strategy development, operational planning, wargaming and decision making, tactics evaluation, and post-exercise analysis. This system will optimize battle group/battle force training and combat readiness. These capabilities are not available in any other system. This program enhances the Naval Warfare Commanders (FLTCINCS), Tactical Training Groups (Atlantic and Pacific), Naval War College and the Naval Postgraduate School. ENWGS will be re-written into the Defense Standard Language Ada FY 1991 - 1993 in order to be rehosted into replacement mainframes in FY 1994.

D. (U) **PROGRAM ACCOMPLISHMENTS AND PLANS:**

1. (U) FY 1990 Accomplishments:
   a. (U) Not applicable
2. (U) FY 1991 Program:
   a. (U) Deliver Release 3.0 to Government.
   b. (U)Commence ENWGS software (Ada) Release 4.0 development.
3. (U) FY 1992 Plans:
   a. (U)Continue development of ENWGS software (Ada) Release 4.0.
4. (U) FY 1993 Plans:
   a. (U)Complete development of ENWGS software (Ada) Release 4.0.
   b. (U)Deliver Release 4.0 to Government.
   c. (U)Commence and complete test and evaluation of software.
   d. (U)R&D task completes in FY 1993.
5. (U) Program to Completion: Not Applicable

E. (U) **WORK PERFORMED BY:** IN-HOUSE: NAVELEXACT, Portsmouth, VA; NAVOCEANSYSCEN, San Diego, CA. CONTRACTOR: Computer Sciences Corporation, Moorestown, N.J.

F. (U) **RELATED ACTIVITIES:** None

G. (U) **OTHER APPROPRIATION FUNDS:** Not Applicable

H. (U) **INTERNATIONAL COOPERATIVE AGREEMENTS:** None

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204571N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Special Projects
PROJECT NUMBER: W1998 PROJECT TITLE: Tactical Combat Training System (TCTS)

C. (U) DESCRIPTION: The requirement for TCTS was established by OR #065-095-88. A FY 1992 start, TCTS will develop and procure instrumentation designed to provide naval combat training from single platform warfighting performance through integration of multi-platform coordinated combat training (surface, subsurface, and air) through and including integrated Battle Group/Force multi-warfare training. To accomplish this, TCTS instrumentation will be designed to provide accurate, realistic and timely feedback of exercise activities without artificially constraining the exercise participants and with a minimum impact on participant support requirements. The instrumentation developed to satisfy fleet training requirements will also provide data for the evaluation of Battle Group readiness and tactical effectiveness, development of tactics and follow-on test and evaluation of new systems. The program includes development of near-term capabilities in conjunction with the Mobile Sea Range (MSR) during FY 1992 to FY 1995. These new capabilities will upgrade the MSR and establish a baseline for TCTS Engineering Development Model (EDM) development in FY 1994 through FY 1997.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:
1. (U) FY 1990 Accomplishments: Not Applicable
2. (U) FY 1991 Program: Not Applicable
3. (U) FY 1992 Plans:
a. (U) Release Request for Proposal (RFP) for preliminary design competition.
b. (U) Evaluate proposals and downselect to two contractors.
c. (U) Initiate MSR Engineering Change Proposals (ECP) I/II/III development.
4. (U) FY 1993 Plans:
a. (U) Award two design competition contracts.
b. (U) Prepare EDM contract.
c. (U) Continue MSR ECP I/II/III development.
d. (U) Prepare for MS II decision.
5. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN HOUSE: NAVAIRDEVCEN, Warminster, PA; NAVAIRTESTCEN, Patuxent River, MD; NWACC CORONA, Corona CA. CONTRACTORS: SRI, Menlo Park, CA; Galaxy Scientific, Inc., West Berlin, NJ; TBD.
F. (U) RELATED ACTIVITIES: Program Element 0204571N, Special Projects, Project W0431, Tactical Aircrew Combat Training System (TACTS). Program Element 0604208N, Portable (Underwater) Tracking System (PTS).
G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT						
OPN/P-1 #188	-0-	-0-	2,500	5,200	182,800	190,500

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205604N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Tactical Information Systems

A. (U) RESOURCES: (Dollars in Thousands)

Project Number	Title	FY 1990 Actual	FY 1991 Estimate	FY 1992 Estimate	FY 1993 Estimate	To Complete	Total Program
X1977	JTIDS	88,804	75,326	63,438	44,349	Cont.	Cont.
X2126	MIDS	(3,000)*	(4,699)*	10,220	15,030	Cont.	Cont.
	Total	88,804	75,326	73,658	59,379	Cont.	Cont.

* MIDS Program transferred to Navy from Air Force in FY 90. In FY 90 and FY 91 MIDS was executed from project X1977. MIDS program is broken out into a separate project for administrative purposes in FY 92.

B. (U) DESCRIPTION:

(U) This program element develops Link 16 which is an integration of the Joint Tactical Information Distribution System (JTIDS) and the Tactical Digital Information Link J (TADIL J).

(U) JTIDS will provide selected U.S. Navy tactical aircraft, U.S. Navy ships and U.S. Marine Corps ground units with crypto secure, jam resistant, low-probability-of-exploitation communication of tactical data and voice at a high data rate. It will have the additional capabilities of common grid navigation and automatic relay inherent in the equipment that will enable long range communication and provide jam resistance. The system will be interoperable among all Services and NATO/Allied users equipped with JTIDS or the NATO MIDS System.

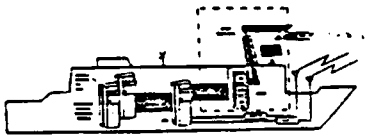
(U) Multifunctional Information Distribution System (MIDS) is a Pre-Planned Product Improvement (P3I) of JTIDS. The goal of the MIDS program is to produce a terminal that is smaller, lighter, fully compatible with and as capable as the JTIDS Class 2 terminal. The MIDS terminal will be suitable for use in platforms that cannot accommodate the larger, heavier JTIDS terminal. The first U.S. Navy planned application of a MIDS terminal is the F/A-18. This project will fund the costs to integrate and test MIDS in the F/A-18. Terminal development costs are funded in program element 0604771D.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

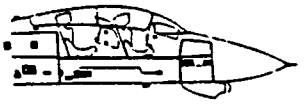
PROGRAM ELEMENT: 0205604N BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Tactical Information System

PROJECT NUMBER: X1977 PROJECT TITLE: Joint Tactical Information Distribution System (JTIDS)







POPULAR NAME: Link-16 - Joint Tactical Information Distribution System (JTIDS)

A. (U)SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	To Complete
Program Milestones		NPDM IIIA	NPDM IIIB	NPDM IIIC IOC	Cont.
Engineering Milestones	Fly F-14D/ E-2C		Complete F-14D Integ.	Complete E-2C Integ. Networks	Deliver Operational Fixes OPEVAL
T&ES Milestones	DT-IIB DT-IIC-1 DT-IID		DT-IIE DT-IIA OT-IIB	DT-IIC-2 OT-IIC TECHEVAL	OPEVAL
Contract Milestones	FSED Block II		LRIP Lot 2	LRIP Lot 3	

BUDGET ($K)	FY 1990	FY 1991	FY 1992	FY 1993	Total Program (To Complete)
Major Contract	41,076	26,657	20,440	7,254	267,462/ (200)
Support Contract	3,915	3,854	2,725	2,496	21,120/ (0)
In-House Support	4,976	4,393	3,757	2,624	25,484/ (977)
GFE/ Other	38,837	40,422	36,516	31,975	221,676/ (8,597)
Total	88,804	75,326	63,438	44,349	535,752/ (9,774)

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205604N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Tactical Information System
PROJECT NUMBER: X1977 PROJECT TITLE: Joint Tactical Information Distribution System (JTIDS)

B. (U) DESCRIPTION:

(U) Combat experience gained during the Southeast Asia conflict, Middle East incidents, and Grenada exposed several deficiencies in United States tactical communication, navigation, and identification systems. Extensive analyses of these combat situations indicate that a joint service, high capacity, secure and jam resistant communication and data link would increase force effectiveness and substantially reduce losses due to hostile action and friend-on-friend engagements. These capabilities are critical in the high speed, long range, and electronically hostile environment envisioned in any substantial modern-day conflict. This includes any engagement with Soviet Bloc nations and, due to the proliferation of high-technology weaponry, many other minor or third world powers.

(U) Link 16 is an integration of the Time Division Multiple Access (TDMA) family of Joint Tactical Information Distribution System (JTIDS) terminals and the Tactical Digital Information Link J (TADIL J) Message Standard. It will provide selected U.S. Navy tactical air, U.S. Navy ships and Marine Corps ground units crypto-secure, jam resistant, low-probability-of-exploitation communication of tactical data and voice at a high data rate. It will have the additional capabilities of common-grid navigation and the use of automatic relay inherent in the equipment that will enable long-range communication and provide jam resistance. The system will be interoperable among all Services and NATO/Allied users equipped with JTIDS or the European version, NATO Multifunctional Information Distribution System (MIDS) (Germany, Italy, France, and Spain). This project will fund the costs to integrate and test JTIDS in the E-2C, F-14D, CV, CG, and DDG.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. (U) Continued E-2C, F-14D,and ship integration.
   b. (U) Continued joint service Automatic Network Management Aid development.
   c. (U) Delivered shipboard antennas for developmental testing.
   d. (U) Delivered first JTIDS networks.
   e. (U) Conducted terminal acceptance tests, DT-IIB, DT-IIC-1, and DT-IID.
   f. (U) Completed first flights of JTIDS terminals installed in E-2C and F-14D aircraft.
   g. (U) Commenced multi-platform and joint service testing.
   h. (U) Awarded contract for Block II FSED (OSD PE0604771D).
2. (U) FY 1991 Program:
   a. (U) Conducted OT-IIA
   b. (U) Complete F-14D integration.
   c. (U) Continue E-2C and ship integration.
   d. (U) Conduct DT-IIE and OT-IIB.
   e. (U) Continue multi-platform and joint service testing.
   f. (U) Continue joint service Automatic Network Management Aid development.
   g. (U) Award LRIP terminal contract (Lot 2).

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205604N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Tactical Information System
PROJECT NUMBER: X1977 PROJECT TITLE: Joint Tactical Information Distribution System (JTIDS)

3. (U) FY 1992 Plans:
   a. (U) Complete E-2C integration.
   b. (U) Continue ship integration.
   c. (U) Conduct DT-IIC-2 and OT-IIC.
   d. (U) Continue multi-platform and joint service testing.
   e. (U) Continue joint service Automatic Network Management Aid Development.
   f. (U) Deliver FSED terminals for continuing developmental/operational testing.
   g. (U) Commence developmental/operational anti-jam testing supporting joint program exit criteria for DAB IIIB full rate production.
   h. (U) Commence TECHEVAL.
   i. (U) Award LRIP terminal contract (Lot 3).
4. (U) FY 1993 Plans:
   a. (U) Complete ship integration.
   b. (U) Continue multi-platform and joint service testing.
   c. (U) Continue joint service Automatic Network Management Aid development.
   d. (U) Deliver Navy unique and joint service operational networks.
   e. (U) Conduct OPEVAL.
   f. (U) Achieve Interim Operational Capability (IOC).
5. (U) Program to Completion:
   a. (U) Complete joint service Automatic Network Management Aid development.
   b. (U) Conduct follow-on E-2C, F-14D, and ship integration, multi- platform, and joint service testing of fixes to operational testing deficiencies.
   c. (U) Award Full Rate Production contract.

D. (U) WORK PERFORMED BY:

IN-HOUSE: NAVOCEANSYSCEN, San Diego, CA; NAVAIRTESTCEN, Patuxent River, MD; FLTCOMBATDIRSSACT, San Diego, CA; FLTCOMBATDIRSSACT, Dam Neck, Virginia Beach, VA; NAVAIRDEVCEN Warminster, PA; NAVELEXCEN, Vallejo, CA.

CONTRACTORS: GEC-MARCONI Electronics System Co., Wayne, NJ; Collins Avionics and Communications Division of Rockwell International, Cedar Rapids, IO; Grumman Aerospace Corp., Bethpage, Long Island, NY; The Boeing Corporation, Seattle, WA.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205604N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Tactical Information System
PROJECT NUMBER: X1977 PROJECT TITLE: Joint Tactical Information Distribution System (JTIDS)

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
1. (U) Technology Changes: None
2. (U) Schedule Changes: None
3. (U) Cost Changes: None

F. (U) PROGRAM DOCUMENTATION:
1. (U) SDDM (JTIDS Milestone II), 1/81
2. (U) MJCS 194-89 (MROC for JTIDS), 11/89
3. (U) Joint JTIDS TEMP 11/90
4. (U) ADM (JTIDS Milestone IIIA), 10/89

G. (U) RELATED ACTIVITIES:
(U) Program Element 0603717N, Command and Control (C2) Systems (Adv). The Command and Control Processor (C2P) is required for Link 16 implementation on ships.
(U) Program Element 0205667N, F-14 Upgrade. Aircraft upgrades include integration with JTIDS.
(U) Program Element 0204152N, Early Warning Aircraft Squadrons Upgrade. Aircraft upgrades include integration with JTIDS.
(U) Program Element 0604771D, Common JTIDS. Funding develops and procures the Navy's Full Scale Development terminals through the Joint Program

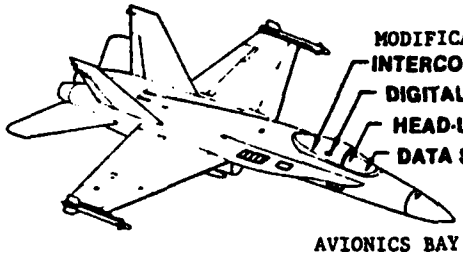
H. (U) OTHER APPROPRIATION FUNDS: (Quantity/Dollars in Thousands)

	FY 1990 Actual	FY 1991 Estimate	FY 1992 Estimate	FY 1993 Estimate	To Complete	Total Progam
(U) PROCUREMENT						
APN (BA1) #10,	0/	30/	7/	6/	1/	44/
11, 24, 25	0	31,487	11,783	11,711	2,442	57,423
APN (BA5) #55,	0/	7/	15/	11/	81/	114/
140	0	7,685	28,425	30,959	223,088	290,157
APN (BA6) #167	0	14,130	20,613	16,003	38,578	89,324
OPN (BA2) #96	0/	8/	10/	9/	63/	90/
	0	24,281	27,552	26,818	139,175	217,796
OPN (BA8) #303	0	4,951	7,324	9,660	18,168	40,022
SCN	0/	0/	0/	1/	0/	1/
	0	0	0	2,653	0	2,653

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.
J. (U) TEST AND EVALUATION DATA: Not applicable to this submission.
Office.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205604N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Tactical Information System
PROJECT NUMBER: X2126 PROJECT TITLE: Multifunctional Information Distribution System (MIDS)



AVIONICS BAY 3R:
MIDS TERMINAL
DOWNSIZED HARM CLC

POPULAR NAME: Link 16 Multifunctional Information Distribution System (MIDS)

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	To Complete
Program Milestones				DAB II	Cont.
Engineering Milestones					Cont.
T&E Milestones					Cont.
Contract Milestones		McAIR Study HARM CLC		F/A-18 Integ Award	Cont.
AWARD					

BUDGET ($K)	FY 1990	FY 1991	FY 1992	Total Program FY 1993	(To Complete)
Major Contract	2,600	3,726	8,500	11,000	Cont.
Support Contract	200	490	520	500	Cont.
In-House Support	200	300	400	400	Cont.
GFE/Other		183	800	3,130	Cont.
Total	(3,000)*	(4,699)*	10,220	15,030	Cont.

* MIDS Program transferred to Navy from Air Force in FY 90. In FY 90 and FY 91 MIDS was executed from project X1977. MIDS program is broken out into a separate project for administrative purposes in FY 92.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205604N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Tactical Information System
PROJECT NUMBER: X2126 PROJECT TITLE: Multifunctional Information Distribution System (MIDS)

B. (U) DESCRIPTION:

(U) The Multifunctional Information Distribution System (MIDS) is a multinational (U.S., France, Germany, Italy, and Spain) cooperative development program established to design, develop, and deliver low-volume (LV), lightweight tactical information system terminals for U.S. fighter aircraft as well as foreign fighter aircraft, helicopters, ships and ground sites. The terminals will be designed as a Pre-Planned Product Improvement (P3I) of the JTIDS Time Divison Multiple Access (TDMA) Class 2 terminals. The goal of the MIDS program is to produce a terminal that is smaller, lighter, fully compatible with, and as capable as the JTIDS TDMA Class 2 terminals but suitable for use on platforms that cannot accommodate the bulkier, heavier JTIDS TDMA Class 2 terminals. The first U.S. Navy planned application of a MIDS terminal is on the F/A-18. This program element will fund the costs to integrate and test MIDS on the F/A-18. Terminal development costs are funded in program element 0604771D.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. (U) Awarded McAir MIDS study contract
   b. (U) Awarded contract to downsize the HARM CLC

2. (U) FY 1991 Program:
   a. (U) Continue downsizing of the the HARM CLC
   b. (U) Contiue McAir MIDS study

3. (U) FY 1992 Plans:
   a. (U) Contiue McAir MIDS study
   b. (U) Continue downsizing of the HARM CLC
   c. (U) Award contract for MIDS F/A-18 integration

4. (U) FY 1993 Plans:
   a. (U) Continue MIDS F/A-18 integration
   b. (U) Complete downsizing of HARM CLC

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205604N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Tactical Information System
PROJECT NUMBER: X2126 PROJECT TITLE: Multifunctional Information Distribution System (MIDS)

5. (U) Program to Completion:
   a. (U) Complete Operation Flight Program (OFP) 96.5 version software
   b. (U) Develop OFP 98.0 version software
   c. (U) Conduct Technical Evaluation
   d. (U) Conduct Operational Evaluation
   e. (U) Award Production Contract
   f. (U) MIDS IOC

D. (U) WORK PERFORMED BY:

IN-HOUSE: NAVAIRTESTCEN, Patuxent River, MD; NAVWEPCEN, China Lake, CA.

CONTRACTORS: McDonnell Douglas; Texas Instruments.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) Technical Changes: None.

2. (U) Schedule Changes: None.

3. (U) Cost Changes: None.

F. (U) PROGRAM DOCUMENTATION:

1. (U) JOR, 1/81 and 7/89
2. (U) Air Force SON, 11/73
3. (U) SDDM (JTIDS Milestone II), 1/81
4. (U) ADM (JTIDS Milestone IIIA), 10/89
5. (U) MIDS MNS, 4/90

G. (U) RELATED ACTIVITES:

(U) Program Element 0205604N, Joint Tactical Information Distribution System (JTIDS): Funds Integration and test costs for JTIDS on the following Navy platforms: E-2C, F-14D, CV, CG/CGN, and DDG.

(U) Program Element 0604771D, Common JTIDS: Funding develops and procures the Navy's JTIDS and MIDS Full scale development terminals.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205604N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Tactical Information System
PROJECT NUMBER: X2126 PROJECT TITLE: Multifunctional Information Distribution System (MIDS)

H. (U) OTHER APPROPRIATION FUNDS: N/A

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Terminal project definition MOU with NATO Nations 14 Nov 86; terminal FSD PMOU and a PRE-FSD Phase Supplement in staffing. An FSD Supplement will be signed prior to the start of FSD.

J. (U) TEST AND EVALUATION DATA: Not applicable to this submission.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205620N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: ASW COMBAT SYS INTEG
PROJECT NUMBER: S0896 PROJECT TITLE: ASWCS

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY1990 ACTUAL	FY1991 ESTIMATE	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0896	ASWCS	14,866	17,521	19,367	20,801	CONT.	CONT.

B. (U) DESCRIPTION: Introduction of the AN/SQQ-89(V) Surface Ship Anti-Submarine Combat System (composed of the Underwater Fire Control System (UFCS) MK116 MOD 5/6/7/8/9, AN/SQR-19 Tactical Towed Array Sonar, AN/UYQ-25 Sonar In-Situ Mode Assessment System, AN/SQS-53B/C hull mounted sonars, and the Light Airborne Multi-Purpose System (LAMPS) MK III signal processor) in surface ships will generate large numbers of passive and active surface and subsurface sonar contacts. An integrated ASW control system is required to effectively correlate, classify, track, etc. contacts from the initial detection to effectively and expeditious threat engagement. This program element develops sensor integration and display sharing software applicable to DD 963, DDG 51 and CG 47 Class ships. The MK 116 MOD 5/6/7/8/9 ASW Control System is essential to ensure the effective utilization of new sensor systems. Without such an automated system, experience has shown that only one target can be effectively manually correlated and tracked.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY1990 ACCOMPLISHMENTS:
   a.(U) Implemented OPTEVFOR deficiency corrections in MOD 8/9 computer programs
   b.(U) Developed ASWCS/SIMAS (Desktop) interface for all MODs.
   c.(U) Initiated development efforts to implement MK 50 torpedo capability.
   d.(U) Continued development of full Operational Specification 411.2 interface with Command and Decision and Command Direction System.
   e.(U) Delivered MOD 8/9 computer programs to DD 977 and DD 974, respectively.
   f.(U) Initial delivery of MOD 7 (DD 978) to Production Test Site (PTS) and ICSTF for Combat Systems Integration Test (CSIT).
   g.(U) Continued safety efforts for MOD 7/8/9.

2. (U) FY 1991 PROGRAM:
   a.(U) Continue design of MOD 8/9 computer programs for full utilization of OPSPEC 411.2 data.
   b.(U) Continue development and test changes required for compatibility with CDS, C&D, and other AN/SQQ-89 elements.
   c.(U) Coordinate ASWCS development with all AN/SQQ-89 elements.
   d.(U) Continue development required for MK 50 torpedo introduction.
   e.(U) Develop MOD 7 OBT training capability.

PROGRAM ELEMENT: 0205620N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: ASW COMBAT SYS INTEG
PROJECT NUMBER: S0896 PROJECT TITLE: ASWCS

f.(U) Complete MOD 8/9 SIMAS (Desktop) interface.
g.(U) Continue safety efforts for MODs 7/8/9.
h.(U) Initiate MOD 7/SIMAS (Desktop) interface development.
i.(U) Continue the implementation of OPTEVFOR deficiency corrections in MOD 7.
j.(U) Implement selected design fixes as identified during MOD 7 OT IIB3 and OT IIIB.
k.(U) Complete delivery of MOD 7 (DD 978) to Production Test Site (PTS) and Integrated Combat System Test Facility (ICSTF) for Combat System Integration Test (CSIT).
l.(U) Deliver MOD 8/9 computer program to Integrated Combat System Test Facility (ICSTF) for Combat System Integration Test (CSIT).
m.(U) Initiate ASWCS design concepts for Acoustic Video Processor (AVP) introduction.

3. (U) FY 1992 Plans:
a.(U) Complete design and initiate development of MOD 8/9 for full utilization of OPSPEC 411.2 data.
b.(U) Continue development and test changes required for compatibility with CDS, C&D, and other AN/SQQ-89 elements.
c.(U) Coordinate ASWCS development with all AN/SQQ-89 elements.
d.(U) Complete implementation of MOD 7 OBT training compatibility.
e.(U) Continue MOD 7 development of changes required for MK 50 torpedo introduction.
f.(U) Complete MOD 8/9 development of changes required for MK 50 torpedo introduction.
g.(U) Continue MOD 7/SIMAS (Desktop) interface development.
h.(U) Continue implementation of AN/SQQ-89 system identified improvements.
i.(U) Continue ASWCS design for Acoustic Video Processor (AVP) introduction.
j.(U) Continue safety effort for MODs 7/8/9.

4. (U) FY 1993 Plans:
a.(U) Complete development of MOD 8/9 programs with full OPSPEC 411.2 data utilization.
b.(U) Continue development and test changes required for compatibility with CDS, C&D, and other AN/SQQ-89 elements.
c.(U) Coordinate ASWCS development with all AN/SQQ-89 elements.
d.(U) Complete MOD 7 development of changes required for MK 50 torpedo introduction.
e.(U) Continue MOD 7/SIMAS (Desktop) interface development.
f.(U) Continue ASWCS development of computer program modifications for Acoustic Video Processor (AVP).
g.(U) Continue safety efforts for MODs 7/8/9.

5. (U) PROGRAM TO COMPLETION: This a continuing program.

PROGRAM ELEMENT: 0205620N **BUDGET ACTIVITY: 4**
PROGRAM ELEMENT TITLE: ASW COMBAT SYS INTEG
PROJECT NUMBER: S0896 **PROJECT TITLE: ASWCS**

D. (U) **WORK PERFORMED BY: IN-HOUSE: NUSC, New London, Ct; NOSC, San Diego, Ca (Lead Laboratory); NSWC, White Oak, Md; Naval Sea Combat System Engineering Station, Norfolk, Va. CONTRACTORS: EG&G Washington Analytical Services Center, Inc., Rockville, Md; Hughes Aircraft Company, Fullerton, Ca; General Electric Co., Syracuse, NY; Westinghouse, Sykesville, Md; Sciences Application Incorporated, San Diego, Ca; Sperry-Univac, Minn, Mn; and Integrated Systems Analysts, Inc., Arlington, Va.**

E. (U) **COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:**
1. (U) **TECHNOLOGY CHANGES: None**
2. (U) **SCHEDULE CHANGES: Delayed introduction of SET V operational software which incorporates MK50 Torpedo Over-The-Side (OTS) capability and other enhancements to ASWCS computer programs.**
3. (U) **COST CHANGES: None**

F. (U) **PROGRAM DOCUMENTATION: NDCP S0896-AS 5/81**

G. (U) **RELATED ACTIVITIES: Program Element 0604212N, Project W1707 (Light Airborne Multi-Purpose System MK III): development of an anti-submarine warfare helicopter for deployment with surface ships. Program Element 0604713N, Project S1916 (ASW Systems Improvement): develops upgrades to the sensors to counter recently identified threat improvements, including reductions in radiated noise, and Over The Side (OTS) MK 50 Torpedo integration.**

H. (U) **OTHER APPROPRIATION FUNDS: Not Applicable.**

I. (U) **INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.**

J. (U) **MILESTONE SCHEDULE: Not Applicable.**

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205633N BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: AIRCRAFT EQUIPMENT R&M IMPROVEMENT PROGRAM (AERMIP)
PROJECT NUMBER: W1041 PROJECT TITLE: AERMIP

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W1041	AERMIP	977	-0-	-0-	-0-	-0-	

B. (U) DESCRIPTION: The AERMIP is the only dedicated Navy program for inservice, out-of-production aircraft equipment with costly reliability and maintainability deficiencies. It provides the most cost effective solution to parts obsolescence problems which are encountered as aircraft and system service lives are extended and/or new (replacement) systems are delayed. It supports commonality initiatives through extension of application and use of Non-Development Items (NDI). The development effort results in application of proven technology to improve readiness and reduce operation and support costs. Return on investment has averaged 1300% of development cost with payback normally achieved in less than two years. AERMIP facilitates the Operational, Safety, and Improvement Program (OSIP) by providing low risk solutions to current Fleet problems. AERMIP also funds the Navy Flight Test General program to provide for high priority flight testing not related to a current acquisition program.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. (U) AAU-19 Common Altimeter improvement contract awarded.
   b. (U) Initiated S-3 Automatic Flight Control System (AFCS) improvement project.
   c. (U) Initiated SH-60 Rotorcraft Simulation improvement project.
   d. (U) Conducted C-130/JATO System validation testing.

2. (U) FY 1991 Program:
   a. (U) Terminate AERMIP

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAVIONICCEN, Indianapolis, IN; NAVAIRTESTCEN, Patuxent River, MD; and various others. CONTRACTORS: IS&S, Malvern, PA; Kollsman Instruments, Merrimack, NH; and others.
E. (U) RELATED ACTIVITIES: Not Applicable
F. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.
G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

FY 1992 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0205658N Budget Activity: 6
Program Element Title: Laboratory Fleet Support
Project Number: X0834 Project Title: Laboratory Fleet Support

A. (U) RESOURCES: (Dollars in Thousands)

Project Number	Title	FY 1990 Actual	FY 1991 Estimate	FY 1992 Estimate	FY 1993 Estimate	To Complete	Total Program
X0834	Laboratory Fleet Support	5,373	6,741	6,512	7,262	Cont.	Cont.

B. (U) BRIEF DESCRIPTION OF PROGRAM ELEMENT: Provides direct assistance to the Fleet by on-site support from Navy laboratories for technical improvement of in-service systems, increased effectiveness of operational systems and ensuring communications between technology producer (RDT&E community) and technology user (Navy/Marine Corps operating forces). The program supports 28 to 30 scientists and engineers at major Navy/Marine Corps operational commands as principal technical advisors.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

Demonstrated automatic HF channel selection; evaluated NON Radio Frequency (RF) guidance beacon for covert Helo landing; adapted single point UHF relay system for multi-platform relay; investigated effects of removing zincs on Mine Sweeper Ocean (MSO) magnetic signatures; demonstrated passive and active decoy use to hide high value targets; demonstrated sub-sub covert data link; evaluated stabilized platform for at sea shipboard telephone system; demonstrated methods for corrosion control aboard Landing Craft Air Cushions (LCACs); demonstrated small boat stabilized platform for night vision devices; and evaluated synthetic aperture radars for floating mine detection.

2. (U) FY 1991 Program:

Support 30 scientists to the major operational commands. Evaluate multi-platform ASW tracking using transients; demonstrate improved methods for launching rigid raider craft; provide SEALs computer aids to secure and dispense hydrographic data; apply digital camera technology for damage assessment; demonstrate alternate SSBN communications route; establish ability for receive/transmit video in forward deployed environment; demonstrate advance radar target identification system on an Guided Missile Frigate (FFG); and evaluate the utility of a mast mounted site for drug interdiction.

3. (U) FY 1992 Plans:

a. Provide level of effort program applying emerging technology in solving fleet readiness issues in Naval Airforce (13%), Naval Surface Force (43%), Fleet Marines (14%), Special Warfare (10%), Submarine Force (15%), and Anti-Drug (5%).

b. Support field team of 32 scientists deployed to the major operational commands.

4. (U) FY 1993 Plans:

a. Technical problem solution will continue on a quick reaction basis covering similar readiness areas given in FY92 plans.

b. Support deployed field team of 35 scientists to the major operational commands.

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: Navy R&D Laboratories & Centers; Naval Oceanographic Office. CONTRACTORS: Applied Research Laboratory (ARL), Penn State, State College, PA; ARL, U. of Texas, Austin, TX; ARL U. of Washington, Seattle, WA; APL, Johns Hopkins, University, Laurel, MD.

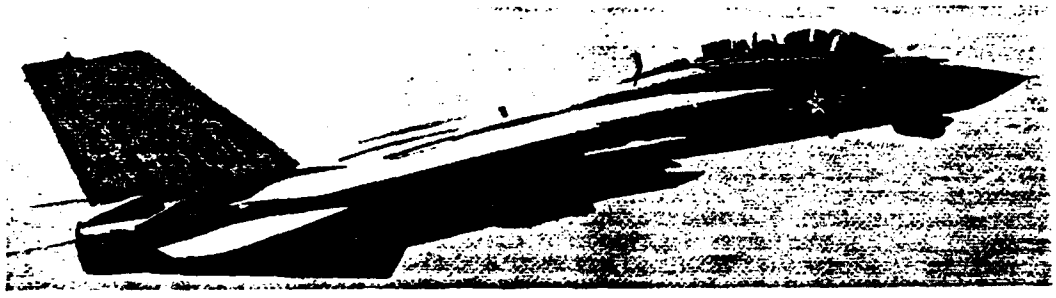
E. (U) RELATED ACTIVITIES: PE 0602936N, Navy Lab Independent Exp. Dev.

F. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205667N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: F-14 Upgrade
PROJECT NUMBER: W1408 PROJECT TITLE: F-14D



POPULAR NAME: F-14D TOMCAT

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	TO COMPLETE
Program Milestones	IIIA-2 01/90	IIIB 03/91			
Engineering Milestones					
T&E Milestones	DT/OT IIC	DT/OT IIIA	DT/OT IIIB	DT/OT IIIC	
Contract Milestones		01/91 APG-71 AWARD			

BUDGET ($K)	FY 1990	FY 1991	FY 1992	FY 1993	Program Total
Major Contract	68,035	80,991	58,846	38,317	To Complete Continuing
Support Contract					
In-House Support	47,291	35,332	54,216	43,730	Continuing
GFE/ Other	2,500	300	3,219	18,282	Continuing
TOTAL	117,826	116,623	116,281	100,329	Continuing*

*Reflects weapons integration.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205667N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: F-14 Upgrade
PROJECT NUMBER: W1408 PROJECT TITLE: F-14D

B. (U) DESCRIPTION: This program element provides for operational improvement of Navy F-14 squadrons in order to counter the projected threat through the year 2000 and beyond. The F-14D will have increased capability in three major areas: new engine, new digital avionics and upgraded radar. These changes will yield significant improvements in capability and performance as well as reliability and maintainability, and will facilitate the total integration and exploitation of related programs, i.e., Air Force Common Joint Tactical Information Distribution System (JTIDS), Airborne Self-Protection Jammer (ASPJ) and Infrared Search and Track System (IRSTS). A Pre-deployment Update (PDU) program (primarily software) includes HARM, AMRAAM, air-to-ground ballistics, fighter-to-fighter data link, Multi-Sensor Mechanization, and radar/ECCM improvements for the F-14D. The PDU program was created because of concurrent development of the F-14D and the above listed common avionics and weapons. It implemented the capabilities inherent in systems incorporated during the FSD program and is a planned integral part of the evolution of the F-14D aircraft. F-14D weapons integration supports integration of electronic warfare improvements, addition of new weapons (i.e., AAAM, HARPOON, etc.), the single-piece windscreen, correction of OPEVAL deficiencies, incorporation of digital flight controls, and various software upgrades. The improvements developed through the upgrade program will be introduced into operational aircraft via the F-14 modificaiton line.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. (U) Integrated final Grumman software tapes.
   b. (U) Demonstrated IRSTS/JTIDS on F-14D.
   c. (U) Continued flight testing to complete demonstration of fully integrated engine, avionics, and radar upgrade.
   d. (U) First F-14D production aircraft delivered in March 1990.
   e. (U) Conducted DT-IIC (TECHEVAL) and started OT-IIC (OPEVAL).
   f. (U) Continued PDU Hardware/Software design, integration and test.
   g. (U) Commenced preliminary design for multi-sensor integration.
   h. (U) Continued initial trainer development.
   i. (U) Conducted Navy Program Decision Memorandum (NPDM) Milestone IIIA for limited production for 20 long wave IRST systems.
   j. (U) Demonstrated IRST imaging capability.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205667N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: F-14 Upgrade
PROJECT NUMBER: W1408 PROJECT TITLE: F-14D

2. (U) FY 1991 Program:
a. (U) Conduct NPDM Milestone IIIB for Full Production decision (March 1991).
b. (U) Finish OPEVAL (December 1990).
c. (U) Continue PDU Hardware/Software integration and testing.
d. (U) Complete initial trainer development.
e. (U) Conduct DT-IIB (TECHEVAL) and OT-IIB (OPEVAL) on Longwave IRSTS.
f. (U) Commence PDU flight test.
g. (U) Investigate/integrate software enhancements resulting from OPEVAL.
h. (U) Conduct NPDM Milestone III A2 for limited production of 40 longwave IRST systems (August 1991).
i. (U) Delivery of final 3 FSD longwave IRST systems.
j. (U) Correct high priority deficiencies identified in F-14D OPEVAL.

3. (U) FY 1992 Plans:
a. (U) Continue PDU hardware/software integration.
b. (U) Continue PDU flight test.
c. (U) Begin preliminary design for weapons integration and commence demonstration and validation (DEMVAL) phase.
d. (U) Conduct OT-IIIB for the first PDU tape.
e. (U) Correction of IRST OPEVAL deficiencies.
f. (U) Conduct DT-IIC (TECHEVAL) and OT-IIC (OPEVAL) on longwave IRST systems.
g. (U) Conduct NPDM Milestones IIIB for full production decision.
h. (U) Delivery of longwave IRST production systems.
i. (U) Continue correction of F-14D OPEVAL deficiencies.

4. (U) FY 1993 Plans:
a. (U) Continue PDU hardware/software integration and testing.
b. (U) Continue PDU flight test.
c. (U) Conduct OT-IIIC for second PDU tape.
d. (U) Complete DEMVAL for weapons integration.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205667N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: F-14 Upgrade
PROJECT NUMBER: W1408 PROJECT TITLE: F-14D Upgrade

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRPROPCEN, Trenton, NJ; NAVAIRTESTCEN, Patuxent River, MD; PACMISTESTCEN, Point Mugu, CA; NAVWPNCEN, China Lake, CA; NAVAIRDEVCEN, Warminster, PA; NAVAVIONICCEN, Indianapolis, IN; NAVAIRENGCEN, Lakehurst, NJ; NAVAVNDEPOTOPSCEN, Patuxent River, MD; NAVAVNDEPOT, Norfolk, VA; and North Island, CA; NAVTRASYSCEN, Orlando, FL. CONTRACTORS: Grumman Aerospace Corporation, Long Island, NY; General Electric, Evandale, OH; General Electric, Utica NY; and Hughes Aircraft Company, El Segundo, CA.

E. (U) COMPARISON WITH AMENDED FY 1991 PRESIDENT'S BUDGET:
1. (U) Technology Changes: None.
2. (U) Schedule Changes: None.
3. (U) Cost Changes: The Department net adjustment of -$4,805K in FY 1991 will reduce the functions of the first F-14D fleet tape release and affect GFE support for HARM integration and AMRAAM.

F. (U) PROGRAM DOCUMENTATION: OR 11/83; NDCP Updated 10/88; TEMP Updated 06/90.

G. (U) RELATED ACTIVITIES: P.E. 0205604N and 0604771D, Development of Air Force Common Joint Tactical Information Distribution System (JTIDS)/ P.E. 0604226N, Airborne Self-Protection Jammer (ASPJ); P.E. 0604314N, AMRAAM; P.E. 0204134N, A-6 Squadrons (initial trainer commonality).

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
PROCUREMENT:						
APN/P1 #1-29	1,421,764	49,559	0	0	0	6,829,045

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) TEST AND EVALUATION: See Congressional Data Sheet.

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FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205670N BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Tactical Intelligence Processing Support

PROJECT NUMBER: X0521 PROJECT TITLE: Shipboard Tactical Intel. Processing

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X0521	SHPBD TAC INTEL PROCESSING	4,198	4,875	2,109	2,593	Cont.	Cont.

B. (U) DESCRIPTION: Navy Intelligence Processing System (NIPS) is an integrated tactical shipboard processing system which is the central data base for the Tactical Flag Command Center (TFCC), Space and Electronic Warfare Commander (SEWC) and tactical mission planning systems. Developing this integrated data base server provides for data distribution (dynamic update of Naval Warfare Tactical Data Base (NWTDB) and Military Integrated Intelligence Data System/Intelligence Data Base (MIIDS/IDB)) and integration with digital map and imagery systems. Distribution to workstations will be via the Survivable Adaptable Fiber Optics Embedded Local Area Net (SAFENET). NIPS began interface development with the Joint Services Imagery Processing - Navy (JSIPS-N) in FY 1990.

C. PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:

a. (U) Continued development testing to provide intelligence data base information to the distributed network; Began JSIPS-N development of initial prototype capability that incorporates JSIPS functionality.

2. FY 1991 PROGRAM:

a. (U) Continue integration of the SYQ-9(V)/MIIDS/IDB with the dynamic data base update and compresssion techniques to support digital imagery via available comms paths; Complete initial prototype capability that incorporates JSIPS functionality; Commence development of improved digital imagery/transmission capability for the Fleet Imagery Support Terminal (FIST).

3. FY 1992 PROGRAM:

a. (U) Continue integration of SYQ-9(V) and MIIDS/IDB.

b. (U) Complete development of improved digital imagery/transmission capability for FIST.

c. (U) Test multi-level security workstation and integrate state-of-the-art hardware into NIPS to support Special Compartmented Intelligence (SCI) requirements.

4. FY 1993 PROGRAM:

a. (U) Continue development testing and integration of SYQ-9(V) and MIIDS/IDB to support Battle Force Power Projection.

5. PROGRAM TO COMPLETION: Continue software development and integration into a unitary software baseline for C3I systems afloat. This is a continuing program.

D. (U) WORKED PERFORMED BY: IN-HOUSE: NAVELEXACT, St. Inigoes, MD; NAVOCEANSYSCEN, San Diego, CA, and NAVELEXSYSENGACT DET Philadelphia, PA. CONTRACTORS: Planning Research Corp., McLean, VA and SAIC Vienna, VA.

E. (U) RELATED ACTIVITIES: PE 0604231N, Navy Tactical Command Systems Afloat (NTCS-A).

F. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETION	TOTAL PROGRAM
(U) PROCUREMENT						
OPN BA 2 #83	5,533	2,064	18,324	10,960	Cont.	Cont.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205675N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Operational Reactor Development
PROJECT NUMBER: S1303 PROJECT TITLE: Operational Reactor Development
A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TOTAL PROGRAM
S1303	Operational Reactor Development	49,512	56,168	58,593	60,174	CONTINUING

B. (U) DESCRIPTION: The objective is to ensure continued safe nuclear propulsion plant operation and improve the operability of plants. This program designs, develops, tests and evaluates improvements to systems and the means to increase component reliability; develops equipment and methods needed for servicing, inspections and evaluations; and develops methods to reduce component and servicing inspections. The need to resolve and to emulate and assess plant performance will increase as the size of the fleet decreases and, consequently, as the value of each ship increases.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:

a. (U) Developed, tested, and evaluated reactor servicing and refueling methods and equipment for CGN 36 Class and NR-1. Qualified containers for shipping radioactive components.

b. (U) Tested operating plant materials for assessed evaluated the effects of . Continued work on steam generator inspection equipment.

c. (U) Continued to identify deficiencies and prove new designs in prototypic tests. Collected component performance data through fleet feedback to improve designs.

d. (U) Developed better core thermal and hydraulic analysis methods to confirm reactor plant operating limits.

e. (U) Developed examination methods and cutting and seal welding techniques.

f. (U) Developed reduction techniques. Continued to develop noise evaluation methods; evaluated

g. (U) Continued to develop methods to backfit equipment into operating plants; developed systems to model plant operations. Continued to develop a

2. (U) FY 1991 PROGRAM:

a. (U) Design, develop, test and evaluate reactor servicing and refueling methods and equipment; develop new containers for shipping radioactive components.

b. (U) Test corrosion resistance of operating plant materials and develop models to characterize corrosion.

c. ( ) Assess develop inspection equipment to minimize personnel radiation exposure.

d. ( ) Conduct prototypic testing of component designs; analyze and resolve concerns about the performance of components, based on fleet feedback. Develop methods to mitigate noise concerns.

e. (U) Conduct thermal, hydraulic, mechanical and structural analyses to establish reactor operating limits and resolve performance concerns.

f. ( ) Develop examination methods for in-service inspection of nuclear plant components; work on welding and cutting techniques.

g. ( ) Develop evaluation methods; evaluate data to identify problems; develop and prove ways to resolve component noise problems.

h. ( ) Develop methods and capabilities to backfit equipment into operating plants; develop systems to model plant operations. Develop a

3. (U) FY 1992 PLANS:

a. ( ) Develop procedures to improve steam generator inspections and cleanings:

inspection equipment to minimize personnel radiation exposure.

b. ( ) Design, develop reactor servicing and refueling techniques and equipment, for the first of a kind servicing of Continue to develop and qualify containers for shipping radioactive components.

c. ( ) Conduct prototypic testing of improved component designs. Continue to resolve concerns about the performance of components Develop procedures and designs to minimize component Develop simpler, more reliable circuit breakers and control equipment to reduce noise concerns and maintenance problems in existing reactor plants.

d. (U) Conduct further thermal, hydraulic, and structural tests and analyses to confirm reactor operating limits and resolve performance concerns.

e. ( ) Continue to develop examination methods for in-service inspection of nuclear plant components; complete welding and cutting development for and continue work on improved welding and cutting techniques.

f. Develop methods and capabilities to backfit equipment into existing operating plants. Evaluate a continue to develop systems to model plant operations.

4. (U) FY 1993 PLANS:

a. ( ) Develop improved processes for testing and analyzing performance data and predicting component failures; continue to assess

Modify and enhance inspection equipment.

b. ( ) Continue to develop procedures and designs to mitigate component and system while reducing maintenance. Continue prototypic testing of improved component designs. Continue to resolve concerns about the performance of components

c. ( ) Continue to: design and develop reactor servicing and refueling methods and equipment; develop designs and techniques for first of a kind servicing for

test and certify containers for shipping radioactive components.

PROGRAM ELEMENT: 0205675N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Operational Reactor Development
PROJECT NUMBER: S1303 PROJECT TITLE: Operational Reactor Development

d. ( ) Continue to develop capabilities to backfit

into operating plants. Start developing improved equipment for integration into existing reactor plants to improve operating efficiency, reliability, and maintainability.

e. (U) Continue to develop methods to confirm reactor operating limits and resolve component performance concerns. Continue to develop systems to model plant operations.

f. ( ) Develop examination techniques, less dependent on the operator, to increase inspection efficiency.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: Contractors: Westinghouse Electric Corporation, Bettis Atomic Power Laboratory and Plant Apparatus Division, Pittsburgh, PA; General Electric Company, Knolls Atomic Power Laboratory and Machinery Apparatus Operation, Schenectady, NY.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
1. (U) Technology Changes: Not Applicable.
2. (U) Schedule Changes: Not Applicable.
3. (U) Cost Changes: Not Applicable.

F. (U) PROGRAM DOCUMENTATION: Not Applicable.

G. (U) RELATED ACTIVITIES: Program Element 0602324N, Nuclear Propulsion Technology, and Program Element 0603570N, Advanced Nuclear Power Systems. No duplication of effort occurs.

H. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE: Not Applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206313M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Telecommunications (Operational Systems)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY1991 ESTIMATE	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C0048	Transmission Subsys Imprv	2,261	1,701	552	466	CONT.	CONT.
C1931	Communication Ancillary Equip.	487	833	2,409	3,204	CONT.	CONT.
C1975a	Digital Comm Terminal	3,676	2,928	872	637	CONT.	CONT.
	TOTAL:	6,424	5,462	3,833	4,307	CONT.	CONT.

a Project previously titled Tactical Communications Center.

B. (U) DESCRIPTION: This program provides for the development and improvement of Marine Corps ground telecommunications items not being developed within the chartered responsibilities of the Joint Tactical Communications Agency. Equipments developed within this program support the mission area of command and control and are those equipments upon which command and control are totally dependent.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206313M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Telecommunications (Operational Systems)
PROJECT NUMBER: C0048 PROJECT TITLE: Transmission Subsystems Improvement

C. (U) DESCRIPTION: This project develops improvements to HF/VHF/UHF radios.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

a. (U) Awarded contract for four, prototype AN/TSC-120 radios.

b. (U) Awarded contract for development of Single Channel Ground Air Radio System (SINCGARS) application program for the Data Transfer Device (DTD).

2. (U) FY 1991 Program: Complete development of the joint application software for the DTD. Test AN/TSC-120 prototypes and conduct Marine Corps Program Decision Meeting (MCPDM) III.

3. (U) FY 1992 Plans: Modify DTD applications software to support AN/GRC-XXX radio. Improve AN/TSC-120 to include Meteor Burst Radio System. Test man transportable Near Vertical Incidence System (NVIS) antenna. Test hopping filters for SINCGARS radios.

4. (U) FY 1993 Plans: Develop and procure installation kits for AN/GRC-XXX. Test SINCGARS/Digital Backbone interface to automate manual switching.

5. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NOSC, San Diego, CA; MCTSSA, Camp Pendleton, CA; NESEA, St Indigoes, MD. CONTRACTORS: ITT, Ft Wayne, IN; Hughes Aircraft, Fullerton, CA; General Dynamics, San Diego, CA.

F. (U) RELATED ACTIVITIES: Navy Program Element 0303401N, Communication Security.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

(U) PROCUREMENT	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
SINCGARS	0	0	39,561	46,130	192,767	278,458
AN/GRCXXX	0	0	0	10,142	11,145	21,287
NVIS	0	0	1,600	1,600	6,581	9,785
AN/TSC-120	0	0	0	5,323	0	5,323

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206313M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Telecommunications (Operational Systems)
PROJECT NUMBER: C1931 PROJECT TITLE: Communications Ancillary Equipment

C. (U) DESCRIPTION: Monitor development of tactical UHF/SHF/EHF satellite communication (SATCOM) terminals. Develop modifications to the AN/TSC-96 UHF Satellite Communication System to maintain interoperability with Navy SATCOM network. Develop improvements to multichannel radio systems.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Completed Digital Wideband Transmission System, Line-of-Sight Radio System (AN/MRC-142) Milestone III decision. Participated with Army on upgrade of AN/PSC-3 UHF Manpack SATCOM Radio upgrade. Built prototype and tested Demand Assign Multiple Access (DAMA) secure voice, command teletype replacement, and antenna replacement modifications for AN/TSC-96. Fielded improved AN/GRC-201 antenna to deployed Marine units.

2. (U) FY 1991 Program: Install DAMA modifications in AN/TSC-96. Develop and install advanced narrowband digital voice terminal (KY-99) secure voice modification in the AN/TSC-96. Continue participation with Army on AN/PSC-3 upgrade.

3. (U) FY 1992 Plans: Develop a single van AN/TSC-96A modification. Continue participation with Army on AN/PSC-3 DAMA upgrade. Monitor Army development of man-transportable MILSTAR terminals.

4. (U) FY 1993 Plans: Continue AN/TSC-96A modification, participation with Army on AN/PSC-3 upgrade and monitor Army development of man-transportable MILSTAR terminals.

5. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NESEC, Vallejo, CA; PM SATCOM, Ft. Monmouth, NJ; MCRDAC, Quantico, VA. CONTRACTORS: NONE.

F. (U) RELATED ACTIVITIES: Various other service efforts.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

(U) PROCUREMENT

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Manpack Radios	4,007	1,195	392	0	0	5,594
AN/TSC-96/PIP	0	0	0	2,000	2,161	4,171
TSC 85A/93A Mod	0	0	694	619	638	1,951

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206313M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Telecommunications (Operational Systems)
PROJECT NUMBER: C1975 PROJECT TITLE: Digital Communication Terminal

C. (U) DESCRIPTION: This project was formerly titled Tactical Communication Center (TCC). All software improvements to the TCC will be completed in FY 1991. The Digital Communications Terminal (DCT) is a lightweight programmable message processor providing the user with a capability of transmitting and receiving formatted and free text message. This project will develop application programs to meet operational requirements.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Developed an expanded memory capability for the DCT, (AN/PSC-2), and the Program Entry Device (PED), MU-848/PSC-2. Continue software improvements to the AN/MSC-63A Tactical Communications Center.

2. (U) FY 1991 Program: Development of software application programs to support operational requirements of Marine Corps commands. Initial review of an DCT emulation capability within a standard personal computer (PC). Complete software improvements to the AN/MCS-63A Tactical Communications Center.

3. (U) FY 1992 Plans: Continue development of software application programs to support operational requirements of Marine Corps commands. Continue to examine a DCT emulation capability within a PC. Review and monitor industry advancements in random access memory (RAM) microcircuits and screen displays.

4. (U) FY 1993 Plans: Continue development of software application programs to support operational requirements of Marine Corps commands. Continue to examine a DCT emulation capability within a PC. Review and monitor industry advancements in random access memory (RAM) microcircuits and screen displays.

5. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MCTSSA, Camp Pendleton, CA; Naval Avionics Center, Indianapolis, IN. CONTRACTORS: Litton Data Systems Division, Van Nuys, CA. ITT Aerospace/Communications Division, Fort Wayne, IN

F. (U) RELATED ACTIVITIES: NONE.

G. (U) OTHER APPROPRIATION FUNDS: NONE

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206623M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Supporting Arms Systems (Operational Systems)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C0010	SMAW	1,424	1,524	1,127	756	175	5,018
C0018	Fire Support Systems PIP	1,500	0	0	0	0	3,036
C0021	AAV7A1	4,935	9,650	4,015	3,661	4,928	33,499
C1120	ADMS	9,189	6,636	3,612	4,066	CONT.	CONT.
C1555	LAV-PIP	2,940	1,476	1,659	0	6,044	120,000
C1763	AAS	94	1,346	454	549	CONT.	CONT.
C1901	GND WPNS (IMP)	3,352	3,190	4,663	7,087	CONT.	CONT.
C1960	LAV-AD	18,207	17,930	4,959	2,981	3,849	47,679
C2086	Soldier/ Marine Enhancement	11,678	0	0	0	0	11,678
	TOTAL:	53,319	41,752	20,489	19,109	CONT.	CONT.

B. (U) DESCRIPTION: This program element provides modification to Marine Corps Expeditionary Ground Force Weapons Systems to increase lethality, range, survivability, and operational effectiveness. It also provides for the block upgrades of the AAV7A1, improvements in command and control in the Air Defense Missile System; and improvements to the Light Armored Vehicle.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206623M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Supporting Arms System (Operational Systems)
PROJECT NUMBER: C0010 PROJECT TITLE: SMAW Product Improvement (PIP)

C. (U) DESCRIPTION: The Shoulder-Launched Multipurpose Assault Weapon (SMAW) is a lightweight, manportable assault weapon with a dual-mode round capable of defeating field/urban fortifications and light armored vehicles. The follow-on High Explosive Anti-Armor (HEAA) projectile war-head is presently in Low Rate Initial Production (LRIP). The launcher is a smooth-bore, fiberglass and epoxy tube equipped with a spotting rifle and optical sight.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Improved the launcher and the HEAA rocket. Reduced the weight 3-5 lbs. Designed a safety qualified Navy explosive. Eliminated the potential of sympathetic detonation. Designed preliminary tandem upgrade that maintains the HEAA capability against reactive threats.

2. (U) FY 1991 Program: Continue new launcher prototype construction, testing of prototypes, Technical Data Package (TDP) development, launcher fabrication, launcher testing, and preparation for MS II review and begin contract preparation for competitive bid.

3. (U) FY 1992 Plans: Continue with design analysis until design freeze. Begin final launcher fabrication and testing of the deliverables. Conduct DT/OT II and prepare for MS III review. Prepare contract for long lead items for full production. Prepare request for proposal (RFP) for production of the launcher.

4. (U) FY 1993 Plans: Conduct initial analysis on firing from enclosures and complete integrated logistics support documentation. Release RFP and conduct source selection. Award production contract and complete logistical requirements for fielding.

5. (U) Program to Completion: Finish TECHEVAL/OPEVAL and complete the production and deployment phase.

E. (U) WORK PERFORMED BY: IN-HOUSE: NSWC Dahlgren, VA CONTRACTORS: TBD

F. (U) RELATED ACTIVITIES: NONE

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT						
SMAW PIP	0	0	0	6,345	7,165	13,510

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206623M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Supporting Arms Systems (Operational Systems)
PROJECT NUMBER: C0021 PROJECT TITLE: AAV7A1 (PIP)

C. (U) DESCRIPTION: This Assault Amphibious Vehicle 7A1 (AAV7A1) Product Improvement Program (AAV7A1 PIP) sustains the capability conduct surface-borne amphibious assaults by improving the present amphibious vehicle so that its effectiveness will be extended until a successor vehicle is fully fielded in 2004.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS: Developed, tested and fielded vehicle pre-planned product improvements, including the Upgunned Weapons Station (UGWS), the Rotary Bow Plane Kit (RBPK), P-900 Applique Armor, Enhanced Applique Armor Kit (EAAK) and the Automatic Fire Sensing and Suppression System (AFSSS). Block upgrades and vehicle modifications are programmed through FY 1996.

1. (U) FY 1990 Accomplishments: Fielded the UGWS, RBPK, AFSSS and EAAK. Exercised contract option for EAAK production.

2. (U) FY 1991 Program: Complete engineering design and fabrication of improved transmission (I-Trans) and improved suspension (I-Susp). Begin testing of improved suspension. Begin concept design on Advanced Propulsion System (APS).

3. (U) FY 1992 Plans: Complete improved suspension testing. Award improved suspension contract. Continue testing of APS. Initiate development and testing of modification kits. These modification kits include overboard exhaust, SINCGARS radio installations, smoke generation and other kits developed as a unit.

4. (U) FY 1993 Plans: Continue development and testing of modification kits, to include NBC, Thermal Day/Night Range Sight (DNRS), APS, turret handling stand and other kits resulting from user input.

5. (U) Program to Completion: Complete in FY 1996.

E. (U) WORK PERFORMED BY: IN-HOUSE: David Taylor Naval Research and Development Center, Carderock, MD. CONTRACTORS: TBD.

F. (U) RELATED ACTIVITIES: NONE.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT						
AAV PIP	13,314	18,991	12,268	16,976	44,498	106,047

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206623M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Supporting Arms Systems (Operational Systems)
PROJECT NUMBER: C1120 PROJECT TITLE: Air Defense Missile System (ADMS)

C. (U) DESCRIPTION:

a. (U) Air Defense Command and Control (AD C2): This program provides hardware and software improvements to the HAWK and STINGER Missile System. This includes efforts to improve tactical digital interface cueing and command and control for all ground based air defense. It also develops data link capability with Tactical Air Data Link-A (TADIL A), TADIL B, LINK 1 and ATDL-1. The Pedestal Mounted STINGER System (PMS) is a lightweight, mobile, gun-missile hybrid mounted on a high mobility multipurpose wheeled vehicle (HMMWV). Pedestal Mounted STINGER is a non-developmental item. The STINGER Night Sight (SNS) is a lightweight (4 - 5 lbs), battery powered viewer that attaches to the STINGER missile system for day/night/reduced visibility operations.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: AD C2: Developed engineering model of command and control network. Field tested ground based data link. Modified HAWK to allow a remote continuous wave acquisition radar to pass target data over radio to a high power illuminator radar.

2. (U) FY 1991 Program: AD C2: Begin testing of Tactical Air Data Information Link (TADIL) A, B and integration of command and control software. HAWK: Continue field testing of expeditionary HAWK, pass Pulse Acquisition Radar (PAR) & Identification Friend or Foe (IFF) data by radio to HAWK equipment. PMS: Continue Engineering Services.

PROGRAM ELEMENT: 0206623M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Supporting Arms Systems (Operational Systems)
PROJECT NUMBER: C1120 PROJECT TITLE: Air Defense Missile System (ADMS)

d. (U) SNS: Issue developmental contract for three (3) vendors producing two (2) sights each. Tech Eval and OTII on selected vendor sights.

3. (U) FY 1992 Plans: Air Defense Command and Control (AD C2): Begin Milestone III testing of Command and Control and datalinks. HAWK: Joint work with Army for three dimensional (3D) radar to replace current radars. Begin work on complimentary missile.
PMS: Continue In-Service Engineering Agent tasking for PMS/ADCC interface and alternative gun study. SNS: In service engineering agent tasking for configuration management.

4. (U) FY 1993 Plans: AD C2: Complete Milestone III command and control tactical digital interface testing and integration of datalinks. Finish software/hardware modifications. HAWK: Continue joint work with Army on 3D radar & complimentary missile. PMS: Continue In-Service Engineering Agent tasking for USMC unique modifications. SNS: In-Service Engineering Agent tasking for P3I studies to increase resolution and weight reduction.

5. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MICOM, Redstone Arsenal, AL and Naval Weapons Support Center, Crane IN. CONTRACTORS: Boeing Aerospace, Huntsville, AL.

F. (U) RELATED ACTIVITIES: All U.S. Army HAWK and PMS activities.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

(U) PROCUREMENT	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
HAWK	1,073	5,889	8,709	4,503	4,000	24,174
PMS	0	0	5,200	11,836	132,780	149,816
SNS	0	0	1,422	5,908	5,900	13,320

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206623M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Supporting Arms System (Operational Systems)
PROJECT NUMBER: C1555 PROJECT TITLE: Light Armored Vehicle (LAV) Product Improvement

C. (U) DESCRIPTION: The family of LAVs consists of six fielded configurations with operational capabilities that significantly enhance the mobility and firepower of the Marine Air Ground Task Force (MAGTF). Since the original urgency of need dictated the fielding of essentially off the shelf vehicles, this project provides the resources to develop, test, and evaluate designated preplanned product improvements.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Initiated development project to improve the LAV Mortar Mount system. Evaluated numerous potential product improvements. Completed evaluation of such items as the bilge pump, voltage regulator, power steering pump and exhaust manifold, each of which was approved for incorporation into the fielded vehicles.

2. (U) FY 1991 Program: Continue development of the 81MM LAV Mortar Mount system. Evaluate LAV brake system improvements.

3. (U) FY 1992 Plans: Complete development of the 81MM LAV Mortar Mount system.

4. (U) FY 1993 Plans: Not Applicable.

5. (U) Program to Completion: This program ends in FY 1992.

E. (U) WORK PERFORMED BY: IN-HOUSE: MCRDAC, Quantico, VA; PM-LAV, Tank Automotive Command, Warren, MI; Naval Surface Warfare Command, Dahlgren, VA; David Taylor Research Center, Bethesda, MD. CONTRACTORS: Diesel Division of GM, London, Ontario, Canada.

F. (U) RELATED ACTIVITIES: NONE.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT						
AAV7A1 PIP	13,314	18,991	12,268	16,976	44,498	106,047

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Many of the product improvements will be incorporated by the Saudi Arabian National Guard in their Foreign Military Sales (FMS) case.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206623M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Supporting Arms System (Operational Systems)
PROJECT NUMBER: C1763 PROJECT TITLE: Amphibious Armor Systems (AAS) Product Improvement Program

C. (U) DESCRIPTION: This project funds the development of amphibious armor modifications to the M1A1 Tank. These mods include the Deep Water Fording Kit (DWFK), Position Locating Reporting System (PLRS), Enhanced Tiedowns, Forward Observer/Forward Air Controller (FO/FAC) Radio Suite, and External Auxiliary Power Unit (EAPU) for the M1A1 Tank.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Completed PLRS/Tiedown testing. Continued development and integration of FO/FAC.

2. (U) FY 1991 Program: Initiate development and integration of EAPU and FO/FAC.

3. (U) FY 1992 Plans: Complete development and integration of EAPU and FO/FAC. Monitor Army's M1A1 Product Improvement Program and explore other developments for affordable, effective, and weight sensitive improvements to satisfy Marine Corps Amphibious Armor Requirements of the expeditionary force role.

4. (U) FY 1993 Plans: Continue to monitor and explore improvements to enhance the safety and reliability of the M1A1 Tank.

5. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MCRDAC, Quantico, VA. CONTRACTORS: General Dynamic Land Systems.

F. (U) RELATED ACTIVITIES: NONE.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT						
M1A1	374,328	0	0	0	0	374,328
M1A1 MOD KITS	0	0	500	500	2,000	3,000

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206623M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Supporting Arms System (Operational Systems)

PROJECT NUMBER: C1901 PROJECT TITLE: Ground Weapons Improvement

C. (U) DESCRIPTION: Develop joint and USMC unique improvements to infantry weapons. Monitors national/international weapons developments.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Completed Root Cause Analysis of caliber .50 SLAP ball and tracer rounds and obtained approval for full rate production. Completed initial phases of Bullet Trap Rifle Grenade engineering and operational testing. Continued development of combat shotguns, ammunition for shotgun and pistol, Thermal Imaging System (TIS) and Close Quarters Battle (CQB) Weapon. Initiated improved Heavy Machine Gun Mount, sling adapter kit, mod kits and monitored infantry mortars. Evaluated Lightweight 155mm Howitzer (LW155) technology. Continued 25mm advanced multi-purpose (AMP) ammo program. Initiated special application sniper rifle program.

2. (U) FY 1991 Program: Complete combat shotgun, ammo programs and mod kit for CQB weapon. Continue M249 Squad Automatic Weapon (SAW), M60E3 machine gun, joint TIS program, and ammo programs for frangible and light armor penetrator rounds. Continue evaluation of artillery technology. See P. E. 0603635M, project C2112, for LW155. Continue 25mm AMP effort.

3. (U) FY 1992 Plans: Continue special application M16A2 300 meter sniper rifle and ammo, M249 SAW, M60E3. Continue joint TIS program. Evaluate artillery technology. Continue 25mm AMP program.

4. (U) FY 1993 Plans: Continue mod kits for Infantry Weapons, thermal program emphasis on short range thermal sight, participate in advanced combat rifles program, evaluation of artillery technology and 25mm AMP program.

5. (U) Program to Completion: Mod kits for M249 SAW and M60E3. Continue evaluation of artillery technology. This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NSWC Crane, IN CONTRACTORS: ARDEC Dover NJ, NSWC Dahlgren VA, NVEOL Ft Belvoir VA, NWC China Lake CA,

F. (U) RELATED ACTIVITIES: All ground weapons systems: USA, USN, USAF, USCG.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT						
M 249 Machine Gun MD	0	0	0	100	400	500
MK19 MG	0	16,936	5,185	0	0	22,131

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206623M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Supporting Arms System (Operational Systems)
PROJECT NUMBER: C1960 PROJECT TITLE: Light Armored Vehicle-Air Defense (LAV-AD)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY1991 ESTIMATE	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C1960	LAV-AD	18,207	17,930	4,982	2,942	3,838	47,679

B. (U) DESCRIPTION: LAV-AD develops a highly effective air defense system on an LAV chassis to provide air defense for rapidly maneuvering ground combat elements in the Marine Air Ground Task Force. The weapons system consists of a rapid fire 25MM gun, STINGER Standard Vehicle Missile Launcher (SVML), and 2.75 inch LAU-68 E/A rocket launcher. The weapons system fire control system integrates a fire control computer, laser range finder, Forward Looking Infrared Radar (FLIR), multimode auto-tracker, video display, optical sights, and vehicle navigation system. The system will have fire-on-the-move capability and be capable of engaging ground targets.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS: LAV-AD will conduct Full Scale Development (FSD) wherein two contractors compete during Developmental/Operational testing and submit production proposals. A source selection process will determine the production contractor.

1. (U) FY 1990 Accomplishments: Delivered prototype. Commenced DT.

2. (U) FY 1991 Program: Complete DT II. Start OT.

3. (U) FY 1992 Plans: Complete OT II Nov 1991. Conduct Physical Teardown and Maintenance Evaluation (PTME) Jan - Mar 1992.

4. (U) FY 1993 Plans: Conduct Source Selection; Award contract for follow-on R&D effort to develop test program sets for software diagnosis and technical data package for chassis changes.

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: PM-LAV TACOM, Warren, MI; NSWC Dahlgren, VA; TECOM, Aberdeen, MD; MCCDC, Quantico, VA; MCLB, Albany, GA. CONTRACTORS: (For the system) GENERAL ELECTRIC, Burlington, VT; FMC, San Jose, CA; (For the chassis) Diesel Division of GM, London, Ontario, Canada.

PROGRAM ELEMENT: 0206623M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Supporting Arms System (Operational Systems)
PROJECT NUMBER: C1960 PROJECT TITLE: Light Armored Vehicle-Air Defense (LAV-AD)

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
1. (U) Technology Changes: NONE
2. (U) Schedule Changes: NONE
3. (U) Cost Changes: NONE

F. (U) PROGRAM DOCUMENTATION:

A.	TEMP	Jul 1988
B.	Required Operational Capability	Jul 1989 (Revised)
C.	ADM (MSARC II)	Apr 1986

G. (U) RELATED ACTIVITIES: Pedestal Mounted STINGER, Program Element 0206623M, Project Number C1120.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands) NONE

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT						
LAV-AD	0	0	0	0	303,123	303,123

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE

J. MILESTONES SCHEDULE:

A.	MSARC II	Apr 1986
B.	FSD Contract Award	Dec 1987
C.	Prototype deliveries	May/Aug 1990
D.	DT II	May 1990 - Feb 1991
E.	Prototype refurbishment	Dec 1990 - May 1991
F.	OT II	Jun - Nov 1991
G.	Funding IPR	Dec 1991
H.	PTME	Jan - Mar 1992
I.	Production RFP	Apr 1992
J.	Receive proposals	Aug 1992
K.	MCPDM III	Nov 1992
L.	Follow-On Contract Award	Dec 1992
M.	Develop Test Program Set and Technical Data Package	Fiscal Years 1993-1994
N.	Production Contract Award	Fiscal Year 1994
O.	Full Rate Production	Fiscal Years 1995-1997
P.	Production deliveries begin	Jun 1996
Q.	Initial Operational Capability	Fiscal Year 1997

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206624M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Combat Services Support (Operational Systems)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY1991 ESTIMATE	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C0076	Combat Service Support PIP	1,326	1,044	105	446	CONT.	CONT.
C0085	Amphibious Raid Equipment	3,242	787	100	128	CONT.	CONT.
	TOTAL:	4,568	1,831	205	574	CONT.	CONT.

B. (U) DESCRIPTION: This program element provides funding for Marine Air Ground Task Force requirements for combat service support equipment improvements. It also provides for evaluation of non-developmental items to support Marine Corps amphibious raid reconnaissance and special operations in low intensity conflicts in all climatic environments. It also provides for improvements in Tactical Fuel Systems equipment and utilities systems items.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206624M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Combat Services Support (Operational Systems)
PROJECT NUMBER: C0076 PROJECT TITLE: Combat Service Support PIP

C. (U) DESCRIPTION: This includes but is not limited to research and development of all areas of motor transport which will increase mobility, maintainability and reliability. It also evaluates systems for improvements in operational capabilities.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS: Tested an air starter system for the Logistics Vehicle System (LVS), and extensively tested a Special Operations Capable Vehicle. Conducted test on universal pretreatment unit to be used with all water purification equipment. Conducted developmental testing (DT) and operational testing (OT) of a Load Moment Indicator for the Marine Corps heavy crane and completed the purchase description. Future plans call for testing Central Tire Inflation for the HMMWV, chassis mounted cranes for the 5 Ton, and various weapons platforms for the HMMWV and 5 Ton vehicles.

1. (U) FY 1990 Accomplishments: Tested a modified LVS and Heavy Equipment Transporter for transportability of the M1A1 Main Battle Tank (MBT). Finished testing for 5 Ton Super Single Tire program. Retrofitted 10 Mk-48 LVS front power units with air starter systems for further field testing. Retrofitted a MK-16 5th wheel with a heavy duty winch and axle. Completed Rigid Raider high mobility multi-purpose wheeled vehicle (HMMWV) towing test. Started M101A1 Howitzer/HMMWV towing test.

2. (U) FY 1991 Program: Develop/test: New suspension system for the 5 Ton truck; A self loading/unloading system for the 5 Ton truck; Bed-mounted crane for the 5Ton truck; Special Operation Vehicle. Improve service life of rubber products.

3. (U) FY 1992 Plans: Develop/test: HMMWV and 5 Ton vehicles weapons platforms; Crane mounted/configured 5 Ton; Special Operations Capable Vehicle; Central tire inflation system for the Logistics Vehicle System.

4. (U) FY 1993 Plans: Develop/test: Contact Maintenance Vehicle; New suspension system for the Logistics Vehicle System.

5. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: The Marine Corps Motor Transport Test Site, Quantico, VA. CONTRACTORS: National Automotive Test Center, Carson City, NV; AAI Coorporation, Cockeysville, MD; Teledyne, Muskegan, MI; Chrysler, Detroit, MI.

F. (U) RELATED ACTIVITIES: NONE.

G. (U) OTHER APPROPRIATION FUNDS: NONE.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206624M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Combat Service Support
PROJECT NUMBER: C0085 PROJECT TITLE: Amphibious Raid Equipment

C. (U) DESCRIPTION: The Amphibious Raid Equipment Project will ultimately field items of equipment which are mission peculiar to the Marine Air Ground Task Force special operations capability. Initiatives are predominantly low cost Non-developmental Items (NDI). Principal requirements are for; Reconnaissance Patrolling, Insertion and Extraction (R-PIE) Diving Equipment Enhancement Program (DEEP); Airborne Capability Enhancement (ACE); Direct Action Equipment Enhancement (DAEE) and Family of Boats (FOB). These requirements enhance mission capability by reducing weight, eliminating equipment redundancies, ensuring compatibility of individual items of equipment and increasing the utility of equipment.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Life cycle cost estimate completed for all R-PIE items. NDI testing coordinated with Marine Corp Operational Test & Evaluation Activity (MCOTEA). Test cells established at Quantico for repetitive, modular testing to reduce costs. Field User Evaluation (FUE) completed for the general purpose survival kit, LAR V Draeger (diving equipment), and 35 hp outboard motor.

2. (U) FY 1991 Program: MS III for the Riverine Assault Craft (RAC), commence and complete FUE for many items, to include: Anti-Exposure Dry Suit; Assault Breachers Kit, Hazardous Material Gas Mask.

3. (U) FY 1992 Plans: Test insertion, extraction and resupply items of equipment for R-PIE.

4. (U) FY 1993 Plans: Test new R-PIE items based on technology advances. New items as required will be added to the R-PIE ROC.

5. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: Marine Corps Research Development and Acquisition Command, Quantico, VA. CONTRACTS: NONE.

F. (U) RELATED ACTIVITIES: NONE

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands):

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT						
Amphibious Raid Equip	4,188	201	616	547	2,188	7,740

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206625M **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Marine Corps Intelligence Systems (Operational Systems)

A. (U) **RESOURCES:** (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY1991 ESTIMATE	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C0062	IAS/PIP	4,177	7,828	5,052	2,230	1,033	26,100
C1296	JSIPS	8,532	13,193	14,533	9,924	2,793	99,285
C1297	TRSS	2,736	1,639	2,630	3,289	CONT.	CONT.
C1928	TERPES	8,554	8,455	6,090	7,989	CONT.	CONT.
	TOTAL:	23,999	31,115	28,305	23,432	CONT.	CONT.

B. (U) **DESCRIPTION:** This progran funds the operational systems development of Marine Corps intelligence equipment that will complement current and future sensors, and will provide systems for data evaluations required to support the operating forces into the next century. Tactical Electronic Reconnaissance Processing and Evaluation System (TERPES) provides an Electronic Intelligence (ELINT) fusion capability for the Marine Air Ground In elligence System (MAGIS).

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206625M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Intelligence Systems (Operational Systems)
PROJECT NUMBER: C0062 **PROJECT TITLE:** Intelligence Analysis Systems (IAS)

C. (U) DESCRIPTION: The IAS program uses an evolutionary acquisition strategy and Non-Development Items of hardware and software to product improve the AN/TYQ-19 Intelligence Analysis Center (IAC), a fielded Marine Expeditionary Force (MEF) asset. The program consists of overlapping sequential block upgrades.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: User Group meeting in January FY 1990. Revised prototype. Evaluated prototype in II MEF Exercise and in Navy/Marine Corps Intelligence Training Center field problem, and deployed with Operation Desert Sheild. Developed software, evaluated candidate shelters, conducted communications analysis, and prepared RFP for intermediate IAS production hardware.

2. (U) FY 1991 Program: Complete inetermediate software development. Publish a production RFP for echelons below the MEF (intermediate IAS) level. Commence incorporation of tactical theater, and national level data bases; and interface with other Marine Air Ground Intelligence Systems (MAGIS) components. Reduce costs by integrating Tactical Electronic Reconnaissance Proocessing and Evaluation Systems (TERPES) software.

3. (U) FY 1992 Plans: Procure 25 Intermediate IAS suites for echelons below the MEF. Continue SW integration for other systems interface and communication. Conduct Follow-on Test & Evaluation on IAC upgrade.

4. (U) FY 1993 Plans: Procure 28 more IAS suites for the Fleet Marine Forces. Incorporate Secondary Imagery Dissemination.

5. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: Naval Weapons Support Center, Crane, IN; Marine Corps Tactical Systems Support Activity, Camp Pendleton, CA; Point Mugu, Oxnard, CA. CONTRACTORS: Atlantic Research Corporation, Dumfries, VA.; Columbia Research Corporation, Dumfries, VA.

F. (U) RELATED ACTIVITIES: Defense Intelligence Agency.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands):

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT						
IAS	0	0	4,021	4,388	0	8,409

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206625M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Intelligence Systems (Operational Systems)
PROJECT NUMBER: C1296 PROJECT TITLE: Joint Service Imagery Processing System (JSIPS)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C1296	JSIPS	8,532	13,193	14,533	9,524	2,793	99,285

B. (U) DESCRIPTION: The JSIPS mission is to acquire and exploit multi-sensor digital imagery in near-real time from national, theater, and tactical platforms, in a soft copy format. JSIPS is not designed to counter a specific enemy threat. The JSIPS will eventually replace the current Imagery Interpretation and Imagery Processing Sub-systems of the Marine Air Ground Intelligence System which only have the capability of analyzing visible spectrum hard copy. The soft copy imagery, linked, digital data, exploitation capability of the JSIPS becomes a critical requirement with the replacement of the RF-4B aircraft with the F/A-18D reconnaissance aircraft and the mid range Unmanned Air Vehicle (UAV).

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

a. (U) Conducted Critical Design Review.

b. (U) Continued FSD development.

2. (U) FY 1991 Program: Conduct testing of Full Scale Development model. Army began testing of their national input system in First Quarter 1991, USMC/USAF Tactical Input System testing Third Quarter.

3. (U) FY 1992 Plans:

a. Achieve MS III decision First Quarter FY 1992.

b. Conduct follow on testing and evaluation for F/A-18D(RC) and Mid-range UAV.

4. (U) FY 1993 Plans:

a. Conduct follow-on testing for RF-16.

b. Develop and integrate pre-planned production activity (P3I) upgrades, common SAR processor, and low volume R/L.

PROGRAM ELEMENT: 0206625M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Intelligence Systems (Operational System)
PROJECT NUMBER: C1296 PROJECT TITLE: Joint Service Imagery Processing Systems (JSIPS)

c. Procure first element of Tactical JSIPS.

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: ESD, Hanscom AFB, MA. CONTRACTORS: E-Systems, Garland, TX. CONTEL, West Lake Village, CA.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Change from 10' shelter to 20' shelter.

2. (U) Schedule Changes: None.

3. (U) Cost Changes: Decrease of $2.5M in FY 1990 and $2.8M in FY 1991 due to technical changes cited above.

F. (U) PROGRAM DOCUMENTATION:

a. (U) Required Operational Capability — Second Quarter FY 1982

b. (U) Letter of Adoption and Procurement (Part I) — Second Quarter FY 1983

c. (U) Letter of Adoption and Procurement (Part I and II) — Second Quarter FY 1988

G. (U) RELATED ACTIVITIES: NONE.

H. (U) OTHER APPROPRIATION FUNDS (Dollars in Thousands)

(U) PROCUREMENT	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
PMC	0	0	0	18,167	44,833	63,000

PROGRAM ELEMENT: 0206625M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Intelligence Systems (Operational System)
PROJECT NUMBER: C1296 PROJECT TITLE: Joint Service Imagery Processing Systems (JSIPS)

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

J. (U) MILESTONE SCHEDULE:

a.	(U) Milestone I	Third Quarter FY 1982
b.	(U) Milestone II	Fourth Quarter FY 1985
c.	(U) Milestone III	First Quarter FY 1992

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206625M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Intelligence Systems (Operational Systems)
PROJECT NUMBER: C1297 PROJECT TITLE: Tactical Remote Sensor System (TRSS)

C. (U) DESCRIPTION: This project develops replacement data packages for reprocurement of the year 1972 inventory items. The system is a remote unattended ground sensor set capable of detecting and providing essential intelligence to the Marine Corps Air Ground Intelligence System during tactical pre-assault, assault, and post assault operations.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Continued integrated logistic support (ILS) documentation. Continued air certification activities on air delivered components. Continued development of digital Imager.

2. (U) FY 1991 Program: Continue ILS documentation. Continue development of non-real time components. Complete air certification for the air components required for initial fielding. Continue modular software improvements required for full capability. Conduct factory training for initial fielding. Conduct First Article Tests and Operational Evaluation with FMF units. Start development of night capable discrimination and classification device.

3. (U) FY 1992 Plans: Initial Operational Capability (IOC) of initial suite of basic sensors, monitors, and relays. Continue ILS documentation. Complete development of airborne relay and initiate procurement. Complete development of night capable discrimination/classification device, and continue software upgrades.

4. (U) FY 1993 Plans: Continue ILS documentation. Initiate development of an imager video library. Initiate development of advanced sensors.

5. (U) Program to Completion: This is a continuing program.

E. WORK PERFORMED BY: IN-HOUSE: Naval Avionics Center, Indianapolis, IN; Naval Air Development Center, Warminster, PA. CONTRACTORS: MITECH Inc., Quantico, VA.

F. (U) RELATED ACTIVITIES: NONE

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT						
TRSS	4,379	2,528	17,052	16,934	16,509	53,023

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206625M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Intelligence Systems (Operational Systems)
PROJECT NUMBER: C1928 PROJECT TITLE: Tactical Electronic Reconnaissance Processing and Evaluation System (TERPES)

C. (U) DESCRIPTION: This system is a segment of the Marine Air Ground Intelligence System (MAGIS). It provides Electronic Intelligence (ELINT) collected from aviation reconnaissance assets. The system processes this intelligence to locate and identify enemy emitters.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Integrated tactical recieve equipment into TERPES system. Began integration of Military Integrated Intelligence Data System-Intelligence Data Base (MIIDS IDB) with commercial SYBASE. Began development of EA-6B datalink. Began integration with the tactical communication system.

2. (U) FY 1991 Program: Complete integration of MIIDS IDB with SYBASE. Complete development of EA-6B datalink with TERPES. Complete integration with the tactical communications center.

3. (U) FY 1992 Plans: Begin development of the full Department of Defense Integrated Intelligence System (DODIIS) and System High Capability. Begin integration with Advanced Tactical Air Command Central (ATACC) datalink requirements. Begin integration with Joint Service Imagery Processing System (JSIP) communication links to include Tactical Air Data Information Link Capability (TADIL).

4. (U) FY 1993 Plans: Continue development of full DODIIS and System High Capability. Continue integration of ATACC datalink requirements. Continue integration of JSIP communication links and TADIL capabilities.

5. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: PMTC, Point Mugu, CA; NAVAIR, Washington, DC; NSWC, Crane, IN. CONTRACTORS: Lockheed, Austin, TX; TRW Vienna, VA.

F. (U) RELATED ACTIVITIES: Program Element 0206625M, Marine Corps Intelligence Systems, (Operational Systems) C0062, Intelligence Analysis Center (IAC), Tactical Remote Sensor System (TRSS).

G. (U) OTHER APPROPRIATION FUNDS: NONE.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206626M **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Marine Corps Command/Control/Communications Systems (Operational Systems)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY1991 ESTIMATE	FY 1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C0045	TACSIIP	8,087	6,348	3,270	3,169	CONT.	CONT.
C0103	MACCS OPS	2,418	3,327	99	548	CONT.	CONT.
C1067	AVIATION RADAR	3,599	5,747	4,110	0	6,354	56,724
C1443	TRNG DEVICE SIM	1,248	2,829	2,328	2,507	2,305	30,330
C2035	PLRS PIP/SUNS/	3,081	8,371	1,047	3,749	CONT.	CONT.
C2102	IDASC	*	*	1,210	1,049	1,030	3,289
C2122	TCO	**	**	6,771	2,963	CONT.	CONT.
	TOTAL:	18,433	26,622	18,835	13,985	CONT.	CONT.

* FY 1990/1991 funded under Project C0103.
** FY 1990/1991 funded under Project C0045.

B. (U) DESCRIPTION: This program provides funding to ensure the inter/intraoperability of tactical command, control, communications, computers, and intelligence systems to the extent required by the Marine Corps and the Department of Defense.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206626M **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Marine Corps Command/Control/Communications Systems (Operational Systems)
PROJECT NUMBER: C0045 **PROJECT TITLE:** Tactical Systems Inter/ Intraoperability Program (TACSIIP)

C. (U) DESCRIPTION: This program ensures the inter/intraoperability of tactical command, control, communications, computers, and intelligence systems to the extent required by the Marine Corps and the Department of Defense.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Continued with the development/ upgrade of the Interoperability Database System (IDBS). Opened up the IDBS to system users. Continued system engineering support for the Development of the Marine Tactical Systems Technical Interface Design Plan (MTS TIDP) and the Marine Tactical Interoperability Test Set (MITS). Published the MAGTF Interoperability Requirements Concepts (MIRC) and the Marine Tactical Communication Architecture (MCTCA), Near-\term. Supported the Development of military standards.

2. (U) FY 1991 Program: Continue with the maintenance of the IDBS and the expansion of the user base. Commence with the graphic representation of the MCTCA in the IDBS. Proceed with updates to the MIRC, MTS TIDP, and MCTCA. Continue to support the development of military standards. Continue development of the mid-term MCTCA. Continued the development of the MITS. Continued to support DoD and NATO working/steering groups.

3. (U) FY 1992 Plans: Maintain/update the IDBS. Complete the graphic representation of the MCTCA in the IDBS. Complete the extension of capabilities to the users. Continue revision/update of the MIRC, TIDP, and MCTCA. Conduct interoperability testing and certification of C4I systems.

4. (U) FY 1993 Plans: Maintain/update the IDBS. Continue revision/ update of the MIRC, TIDP, and MCTCA. Proceed with the interoperability testing and certification of C4I systems.

5. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MCRDAC, Quantico, VA.; MCTSSA, MCB, Camp Pendleton, CA.; MCCDC, Quantico, VA. CONTRACTORS: Eagle Technology, INC., Dumfries, VA.; NRS CORP., Colorado Springs, CO.

F. (U) RELATED ACTIVITIES: Marine Corps tactical C4I systems.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands): NONE.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206626M **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Marine Corps Command/Control/Communications Systems (Operational Systems)
PROJECT NUMBER: C0103 **PROJECT TITLE:** Marine Air Command and Control Systems Operational Development (MACCS OPS)

C. (U) DESCRIPTION: This project supports the Air Command and Control Systems for Marine Corps and Joint/Allied interoperability and compatibility.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS: Preliminary designs for physical and functional enhancements were approved and prototype hardware developed. Conducted studies to determine the scope of data to be processed in the Interim Direct Air Support Center (IDASC) and candidate software and hardware upgrades were reviewed.

1. (U) FY 1990 Accomplishments: Reviewed NDI software packages. Modified Defense Mapping Agency (DMA) mapping application software package. Continued to design prototype physical upgrades. Designed 60 Hz AC power conversion kits and developed engineering change proposal. Fielded Version P software for the AN/TYQ-3A and in the process of updating the software to Version R. IDASC accomplishments in, in this Program Element, Project Number C2101.

2. (U) FY 1991 Program: Continue software modification to IDASC. An additional prototype will be build and suitability testing conducted. Continue to develop the KG-84 modification to the AN/TYQ-3A. Modify the Data Link Emulator Unit (DLEU) to be compatible with the Tactical Air Operations Module (TAOM) and Advance Tactical Air Command Central (ATACC). Field Version R of the AN/TYQ-3A software. Develop modifications to TAOM software/firmware to record and monitor Joint Tactical Air Operations (JTAO) messages. Continue with IDASC in this Program Element in Project Number C2102.

3. (U) FY 1992 Plans: Correct interoperability problems which arise with the fielding of TAOM and performance envelope deficiencies identified when TAOM undergoes joint testing.

4. (U) FY 1993 Plans: Continue to correct interoperability problems which arise with the fielding of TAOM and performance envelope deficiencies identified when TAOM undergoes joint testing.

5. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MCRDAC, Quantico, VA; MCTSSA, Camp Pendleton, CA; NAVELEX, Vallejo, CA. CONTRACTORS: Litton, Van Nuys, CA.

F. (U) RELATED ACTIVITIES: US Air Force Modular Control Equipment and New Mobile Radar Approach Control.

G. (U) OTHER APPROPRIATION FUNDS: NONE.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206626M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Command/Control/Communications Systems (Operational Systems)
PROJECT NUMBER: C1067 PROJECT TITLE: Aviation Radar Product Improvement

C. (U) DESCRIPTION: This project funds modifications in response to field identified discrepancies for existing radars. The modifications include electronic counter-counter measures (ECCM), reliability improvements, and new threat enhancements. Multi-spectral Sensor Suite (MSSS) is a suite of active and passive ground based long range surveillance sensors to detect aircraft and missiles.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Initiated development of a data collection system to verify the capability of the AN/TPS-59 radar to perform the Low Radar Cross Section Detection. Initiated reliability improvement program. MSSS-1: Assumed contract from USAF for non-developmental items (NDI) models in March 1990. MSSS-2: Evaluated candidate systems.

2. (U) FY 1991 Program: Complete verification of AN/TPS-59 Low Radar Cross Section capabilities. Develop specification for full scale development of a Modification Kit. Continue reliability improvement study and analyses. MSSS-1: Continue improvement of system software/hardware. MSSS-2: Select system and begin development of an Engineering Development Model (EDM). NDI Radar: Evaluate NDI candidate systems. Update specification.

3. (U) FY 1992 Plans: MSSS-1: Test Engineering Development Model (EDM) software/hardware improvements. Begin Preplanned Product Improvement (P3I). MSSS-2: Continue development of EDM. NDI Radar: Continue evaluation of NDI radars. Update specification.

4. (U) FY 1993 Plans: Not Applicable.

5. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MCRDAC, Washington, D.C.; NOSC San Diego, CA; NRL, Washington D.C. CONTRACTORS: Sensis Corp, Syracuse, NY; GE, Syracuse, NY; ITT Gilfillan, Van Nuys, CA; LTV, Buffalo, NY; Westinghouse, Baltimore, MD.

F. (U) RELATED ACTIVITIES: NONE.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT						
MSSS	0	0	0	0	51,865	CONT.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206626M **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Marine Corps Command/Control Communications Systems (Operational Systems)
PROJECT NUMBER: C1443 **PROJECT TITLE:** Training Devices/Simulators Program

C. (U) DESCRIPTION: Marine Air Ground Task Force (MAGTF) Tactical Warfare Simulation (MTWS) is a product improvement for the Tactical Warfare Simulation, Evaluation and Analysis System (TWSEAS). MTWS is a tactical command and control training system for the MAGTF commander and his staff which will provide realistic tactical training through wargaming.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Completed requirements analysis. Baselined: System Specification, Interface Requirements Specification (IRS), System Segment Design Document (SSDD), and System Requirement Specification (SRS). Proceeded into Software Design Phase (preliminary) with drafting and staffing of complete DOD Std 2167A documentation. Procured prototype set of hardware and software (commercial) for development.

2. (U) FY 1991 Program: Complete Design Phase (preliminary and detailed) with all documentation baselined. Commence Coding Phase for software modules. Develop test plan and test description. Procure modified suite of hardware for subsequent use in operational tests.

3. (U) FY 1992 Plans: Procure operational test site, hard and software (commercial). Commence Coding/Testing Phases.

4. (U) FY 1993 Plans: Complete coding/testing phases. Conduct formal qualification test. Commence fielding, training and operational testing by site.

5. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: Naval Ocean Systems Center (NOSC), San Diego, CA. CONTRACTORS: Systems Exploration Inc., San Diego, CA.

F. (U) RELATED ACTIVITIES: NONE.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT						
PMC	0	0	0	1,411	694	2,105

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206626M **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Marine Corps Command/Control/Communications Systems (Operational systems)
PROJECT NUMBER: C2035 **PROJECT TITLE:** PLRS PIP/SUNS NAVSTAR/GPS

C. (U) DESCRIPTION: The Position Location Reporting System Product Improvement Plan (PLRS PIP) consists of a Downsized Master Station (DSMS), the PLRS Communication Enhancement (PCE) and the Global Positioning System Interface Unit (GPSIU).

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS: DSMS requires a 4 year development effort with production in FY 1995. PCE is a 3 year development effort with production in FY 1994. GPSIU is a 3 year development effort with production in FY 1994. GPS is a 2 year test with Non-Developmental Item (NDI) procurement in FY 1992.

1. (U) FY 1990 Accomplishments: Conducted concept demonstration of the PCE, Oct 90 Camp Pendleton, CA. Began GPSIU prototype development. Developed PLRS Test Program Sets.

2. (U) FY 1991 Program: Enter in a cooperative effort with the Army and Navy to rewrite the current C 3-2 software into ADA for application with DSMS. Development of PCE and GPSIU continues. Continue doing Demo/Eval of various GPS receivers.

3. (U) FY 1992 Plans: Integrate hardware and software for the DSMS.

4. (U) FY 1993 Plans: Continue development of GPSIU and PCE.

5. (U) Program to Completion: Continue the PLRS PIP and development of the GPS.

E. (U) WORK PERFORMED BY: IN-HOUSE: CONTRACTORS: DSMS; PCE Hughes Aircraft Co. Fullerton, CA; GPSIU NADC Warminster, PA; Joint Program Office (JPO), Los Angeles Air Force Station, LA, CA; DSMS, MCTSSA, Camp Pendleton, CA; CECOM, Ft. Monmouth, NJ.

F. (U) RELATED ACTIVITIES: A cooperative effort in software rewrite with the Army and Navy is being coordinated.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

(U) PROCUREMENT	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
GPS	0	0	968	930	7,993	11,089
PLRS DSMS	0	0	0	0	2,300	2,300
PLRS COMM ENH	0	0	0	0	2,000	2,000

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206626M **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Marine Corps Command/Control/Communications Systems (Operational Systems)
PROJECT NUMBER: C2102 **PROJECT TITLE:** IDASC Product Improvement Program

C. (U) **DESCRIPTION:** The current Improved Direct Air Support Center (IDASC) will be upgraded to include physical/functional enhancements and a digital data interface to associated C2 systems. Improvements include digital mapping display and information overlay, communications processing and data base manipulation.

D. (U) **PROGRAM ACCOMPLISHMENTS AND PLANS:** Preliminary designs for physical and functional enhancements were approved and prototype hardware developed. Work will continue on review and modification of off-the-shelf software and selection of prototype hardware as well as determining software baselines and prioritizing system upgrades. FY 1990 and FY 1991 development funds were contained in 0206626M, C0103 Marine Air Command and Control Systems.

1. (U) FY 1990 Accomplishments: Non developmental Item (NDI) software packages have been under review. A modification effort to a typical Defense Mapping Agency (DMA) mapping application software package is ongoing at NAVELEX, Vallejo, CA. Candidate hardware has been acquired and a prototype system demonstrated. Continue design and prototype of physical upgrades.

2. (U) FY 1991 Program: Work will continue in software modification. An additional prototype will be built. Suitability testing will be conducted.

3. (U) FY 1992 Plans: Down-size the DASC and incorporate previous hardware and software upgrades into highly mobile Standard Integrated Command Post (SICP)-style shelters. Continue block upgrades to the software program including communications interfaces to Tactical Combat Operations-Multi-Service Advanced Field Artillery Tactical Data System (TCO-MAFATDS).

4. (U) FY 1993 Plans: Continue to develop a downsized prototype and upgrading system software to include compatibility with all external command and control agencies.

5. (U) Program to completion: This is a continuing program.

E. (U) **WORK PERFORMED BY:** IN-HOUSE: NAVELEXCEN, Vallejo, CA; MCTSSA, Camp Pendleton, CA. CONTRACTORS: NONE.

F. (U) **RELATED ACTIVITIES:** NONE.

G. (U) **OTHER APPROPRIATION FUNDS:** (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT	0	0	3,264	613	0	3,877

H. (U) **INTERNATIONAL COOPERATIVE AGREEMENTS:** NONE.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206626M **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Marine Corps Command/Control/Communications Systems (Operational Systems)
PROJECT NUMBER: C2122 **PROJECT TITLE:** Tactical Combat Operations (TCO)

C. (U) **DESCRIPTION:** TCO will be the focal point of Marine Air Ground Task Force (MAGTF) command and control (C2). It will provide the automation required by MAGTF and subordinate commanders for the receipt, fusion, display and dissemination of selective input from the other C2 systems.

D. (U) **PROGRAM ACCOMPLISHMENTS AND PLANS:** TCO will become the fusion center of the Marine Tactical Command and Control Systems (MTACCS) concept. Integration of program systems such as Advanced Tactical Air Command Central (ATACC), Intelligence Analysis System (IAS), Improved Direct Air Support Control (IDASC) and Marine Integrated Personnel System (MIPS).

1. (U) FY 1990 Accomplishments: Defined TCO systems engineering and acquisition strategy to deploy a baseline TCO system which provides for the integration of associated MTACCS systems such as Marine Air Command and Control Systems (MACCS), INTEL, and Marine Integrated Personnel System/Marine Integrated Logistics System (MIPS/MILOGS).

2. (U) FY 1991 Program: Evolutionary design labeled as Field Development Systems (FDS) will take all systems residing under this program through further design and hardware selection. FDS I will be conducted and followed by FDS II. Prepare an RFP.

3. (U) FY 1992 Plans: TCO will reach Milestone III in 1st Quarter. Contracts for selected hardware will be initiated. Additional requirements identified in FDS I and II will be addressed through further software design and FDS III will be the baseline to test improvements, new design and interoperability.

4. (U) FY 1993 Plans: Conduct FDS III with development of MTACCS. Achieve Milestone III.

5. (U) Program to Completion: This is a continuing program.

E. (U) **WORK PERFORMED BY:** IN-HOUSE: None. CONTRACTORS: Pacific Northwest Labs, Seattle, WA; Command Systems Incorporated, Fort Wayne, IN; TRW, Los Angeles, CA.

F. (U) **RELATED ACTIVITIES:** All projects in Program Element 0206626M, Marine Tactical Combat Command and Control Systems.

G. (U) **OTHER APPROPRIATION FUNDS:** (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT						
TCO	0	0	0	0	9,617	9,617

H. (U) **INTERNATIONAL COOPERATIVE AGREEMENTS:** NONE.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0208010M **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Joint Tactical Communications Program (JTCP)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY1991 ESTIMATE	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C0049	ULS	752	1,090	302	349	CONT.	CONT.
C0065a	COMM CON	1,121	913	371	534	CONT.	CONT.
	TOTAL	1,873	2,003	673	883	CONT.	CONT.

a. Project formerly titled JTCCA

B. (U) DESCRIPTION: This program element provides for development of the Joint Unit Level Switches (ULS) and supporting equipments. Equipments developed within this program element support the mission area of command and control and specifically support the switching requirements of the various subsystems within the Marine Corps Tactical Communications Architecture. The Assistant Secretary of Defense (ASD, C3I) for Command, Control, Communications and Intelligence has designated the Marine Corps as the developing service for ULS and the ASD provides funding for Marine Corps testing of Joint Tactical Command, Control and Communications Program equipments. The ULS project consists of product improvements to the Unit Level Circuit Switch (ULCS), Unit Level Tactical Data Switch (ULTDS), and their peripherals. The Communications Control (COMMCON) project involves development in the areas of Systems Planning and Engineering (SPE), Operational Systems Control (OSC), and Technical Control (TECHCON) required to deploy, operate, and restore the Marine Corps tactical communications systems. The program also contains funds to support Marine Corps JTCP Testing.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0208010M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Joint Tactical Communications Program
PROJECT NUMBER: C0049 PROJECT TITLE: Unit Level Switches Product Improvement (ULS)

C. (U) DESCRIPTION: The Unit Level Circuit Switch (ULCS) and Unit Level Tactical Data Switch (ULTDS) will provide the backbone of the digital communications architecture within the Marine Corps. This project will incorporate product improvements recommended by the Fleet Marine Force (FMF) through operational testing.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Engineered and began building 60 developmental front end hardware processor cards to demonstrate ULTDS interface with personal computers and local area networks (LAN). Supported limited fielding of engineering models of ULTDS for purpose of user evaluation.

2. (U) FY 1991 Program: Utilize engineering developmental Model AN/GYC-7 data switches for ULTDS/ULCS software integration and support. This is a pre-planned product improvment (P3I) to the ULCS. Evaluate FMF recommendations for ULTDS improvements.

3. (U) FY 1992 Plans: Incorporate ULTDS software improvements. Investigate digital architecture accessibility improvements.

4. (U) FY 1993 Plans: Continue investigation of digital architecture accessibility improvements.

5. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MCRDAC, Quantico, Va. CONTRACTORS: Atlantic Research Corporation, Rockville, MD; ITT Defense Communications Division, Nutley, NJ.

F. (U) RELATED ACTIVITIES: Program Element 0208010A, Tri-Service Joint Tactical Communications Program, Army; Program Element 0208010F, Tri-Service Joint Tactical Communications Program, Air Force; Program Element 0208020N, Tri-Service Joint Tactical Communications Program, Navy.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT						
ULCS	48,197	32,898	12,683	7,363	2,900	104,041

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0208010M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Joint Tactical Communications Program
PROJECT NUMBER: C0065 PROJECT TITLE: Communications Control (COMM CON)

C. (U) DESCRIPTION: This project was formerly titled JTCCA. The project for Communications Control (COMMCON) consists of three acquisition areas; (1) Systems Planning and Engineering (SPE), (2) Operational Systems Control (OSC), and (3) Technical Control (TECHCON). These functions are required to deploy, operate, and restore Marine Corps tactical communications systems. The System Planning, Engineering, and Evaluation Device (SPEED) is a microcomputer system which supports Marine Corps tactical communications systems planning, engineering, and evaluation processes. SPEED maximizes the utility of tactical communications systems. This project supports Joint Tactical Communications Program (JTCP) testing.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Finalized core capabilities and initiating the Pre-planned Product Improvement (P3I) program. Operational testing was successfully completed. The Required Operational Capability was finalized and approved. A production decision for SPEED was approved. The core SPEED was placed under configuration control. Two P3IP modules were completed and tested in support of SINCGARS and PLRS. Three prototype Portable TECHCON systems were delivered for field testing. Four prototype SPEED's were deployed to Operation Desert Shield.

2. (U) FY 1991 Program: SPEED will acquire more capabilities for tactical automated switch network planning, multichannel radio frequency deconfliction, communications equipment interconnection, compatibility analysis, automated Communications-Electronics Operating Instructions (CEOI), co-site analysis, communications satellite planning, communications annex generation, and a plans data base. Field to operational Marine Corps Forces by 3rd Qtr.

3. (U) FY 1992 Plans: Continue the P3I program in the areas discussed above. Also address the evolution of SPEED to evolve and integrate into the functional areas of systems control and technical control.

4. (U) FY 1993 Plans: Continue the P3I program in the areas discussed above. Continue the evolution of SPEED into the areas of OSC and TECHCON.

5. (U) Program to Completion: This is a continuing program

E. (U) WORK PERFORMED BY: IN-HOUSE: CONTRACTORS: ECAC, Annapolis, MD and Tobyhanna Army Depot, PA. CONTRACTORS: Atlantic Research Corporation, Rockville, MD. and Eagle Technology, Orlando FL.

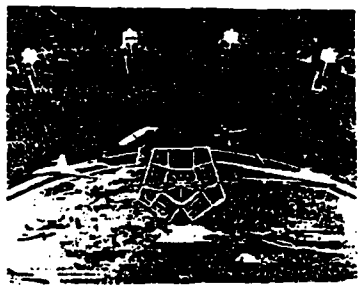
F. (U) RELATED ACTIVITIES: Program Element 0208010A, Tri-Service Joint Tactical Communications Program, Army; Program Element 0208010F, Tri-Service Joint Tactical Communications Program, Air Force.

G. (U) OTHER APPROPRIATION FUNDS: NONE

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE UNCLASSSIFIED

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0303109N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: SATELLITE COMMUNICATIONS
PROJECT NUMBER: X0731 PROJECT TITLE: FLEET SATELLITE COMMUNICATIONS
POPULAR NAME: SATCOM



A. (U) SCHEDULE/BUDGET INFORMATION:

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	TO COMPLETE
Program Milestones		TADIXS Phase IV IOC 6/91			
Engineering Milestones	Mini-DAMA PDR 3Q/90	Mini-DAMA CDR 3Q/91	TACINTEL II PDR 4Q/92	TACINTEL II CDR 3Q/93	
T&E Milestones				MINI-DAMA DT/OT Universal Modem DT II	
Contract Milestones					

BUDGET ($K)	FY 1990	FY 1991	FY 1992	FY 1993	PROG TOTAL TO COMPLETE
Major Contract	11,788	10,041	23,000	23,525	Cont.
Support Contract	1,312	1,085	1,506	2,241	Cont.
In-House Support	2,685	844	6,596	7,919	Cont.
GFE/ Other	21	20	20	20	
Total	15,806	11,990	31,122	33,705	Cont.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0303109N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Satellite Communications
PROJECT NUMBER: X0731 PROJECT TITLE: Fleet Satellite Communications

B. (U) BRIEF DESCRIPTION OF MISSION REQUIREMENT AND SYSTEM CAPABILITIES:
Fleet Satellite Communications provides satellite communications worldwide for fleet operations. The project supports development of shipboard and shore based equipment operating throughout four communication satellite systems: Fleet Satellite (FLTSAT) Communications, Leased Satellite (LEASAT) Communications, and Defense Satellite Communication System (DSCS). One mission is to provide global, continuous, secure communications among Naval Forces. A second mission is to provide secure and anti-jam communication between command centers and fleet commanders using DSCS satellites. Specifically these efforts provide for development of Ultra High Frequency (UHF) communications systems, network controllers, time division multiplexers, and tactical support for super high frequency terminals. The Fleet Satellite Communication System provides fleet broadcast service to all Navy ships, Over-the-Horizon Targeting data for TOMAHAWK and Flag configured ships, submarine communications, intelligence data, and various other battle group satellite communications circuits. The Super High Frequency (SHF) terminals operate within the Defense Satellite Communicatien System. This project consists of several individual but related elements for satellite communications to different tactical users. Within any one satellite system, several subsystems are being developed to solve unique problems for different users. Tactical Data Information Exchange Subsystem (TADIXS) serves as the primary shore-to-ship communication line for providing over-the-horizon targeting data to TOMAHAWK missile equipped ships. The Miniature Demand Assigned Multiple Access (Mini-DAMA) system will provide the same satellite channel utilization efficiencies for aircraft and submarines that are now enjoyed by surface ships and shore stations equipped with the larger version TD-1271 DAMA multiplexer. Officer in Tactical Command Information Exchange Subsystem (OTCIXS) phase II software will be developed to provide OTCIXS Battle Group command and control data on a DAMA channel on the satellite. Sending OTCIXS data on DAMA frees valuable satellite channels for other fleet operational use. Tactical Intelligence information exchange subsystem (TACINTEL II) will expand the access to and exchange of special intelligence information for ships, air craft and afloat command centers.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS
   a. (U) Continued development of the TADIXS phase IV software and OTCIXS II (DAMA capable) software
   b. (U) Conducted PDR for MINI-DAMA FSD
   c. (U) Completed WSC-6(V)2 DT/OT
2. (U) FY 1991 PROGRAM
   a. (U) Conduct CDR for MINI-DAMA FSD
   b. (U) IOC TADIXS Phase IV/V and OTCIXS II
   c. (U) Prototype of critical functions of Link protocols and media sharing for TACINTEL II
3. (U) FY 1992 Plans
   a. (U) Continue Mini-DAMA Full Scale Development
   b. (U) TADIXS Phase IV FOC and OTCIXS II FOC
   c. (U) Start of WSC-6(V)2 upgrades
   d. (U) Commence evolutionary TACINTEL II acquisition
   e. (U) Support Universal Modem development

4. (U) FY 1993 Plans
   a. (U) Continue Mini-DAMA Full Scale Development
   b. (U) Conduct Mini-Dama DT II
   c. (U) Start Mini-Dama OT II
   d. (U) Continue TACINTEL II Evolutionary Acquisition
   e. (U) Continue WSC-6(V)2 upgrades
   f. (U) Conduct Universal Modem DT II
5. (U) PROGRAM PLAN TO COMPLETION:
   a. (U) Conduct Universal Modem OT II and acheive IOC & FOC
   b. (U) Complete Mini-DAMA Full Scale Development, conduct O/T milestone III for V3
   c. (U) Achieve Mini-Dama IOC and FOC
   d. (U) Achieve TACINTEL II IOC and FOC
   e. (U) Complete WSC-6(V)2 block upgrade testing
   f. (U) Conduct O/T M/S III for V1

D. (U) WORK PERFORMED BY:

Contractors. Advanced Digital Systems, Inc, San Diego, CA; MA/COM, San Diego, CA; Computer Science Corporation, Falls Church, VA; Advanced Communication Systems, Inc., Arlington, VA; In-house. NAVOCEANSYSCEN, San Diego, CA; NCST, Washington, D.C.; NAVELEXSYSENGACT, St. Inigoes, MD; NAVELEXSYSENGCEN, Vallejo, CA; NAVELEXSYSENGCEN, Charleston, SC; NUSC, New London, CT.

E. (U) COMPARISON WITH REVISED FY 1991 PRESIDENT'S BUDGET:

1. (U) TECHNICAL CHANGES: NONE

2. (U) SCHEDULE CHANGES: NONE

3. (U) COST CHANGES: NONE

F. (U) PROGRAM DOCUMENTATION

DCP 99R5 (DAMA) dtd 7/72
JOR H-C123-75 (DAMA) dtd 1/86
OR 174-094-87 (MINI-DAMA) dtd 6/87
OR 184-094-89 (TACINTEL II) dtd 7/87
TEMP 252-10 (MINI-DAMA)
TEMP 252-8 (OTCIXS)
TEMP 252-9 (UHF DAMA)

G. (U) RELATED ACTIVITIES.

None

H. (U) OTHER APPROPRIATION FUNDS:

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPL	TOTAL PROGRAM
OPN *	31,785	36,228	55,646	50,654	Continuing	

* Include UHF and SHF Procurement and installation cost identified in SATCOM Ship Terminals and SATCOM Shore terminals. OPN P-1 lines.

QUANTITIES (VARIOUS)

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE

J. (U) TEST AND EVALUATION DATA: NONE

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0303131N BUDGET ACTIVITY: 3 Strategic Programs
PROGRAM ELEMENT TITLE: Minimum Essential Emergency Communications Network (MEECN)
PROJECT NUMBER: X0795 PROJECT TITLE: SUPPORT OF MEECN

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMP	TOTAL PROGRAM
X0795	MEECN	1,305	1,552	2,365	1,383	Cont.	Cont.

B. (U) DESCRIPTION: This project identifies, researches, and develops improvements to the Minimum Essential Emergency Communications Network (MEECN), with emphasis on systems operating in the VLF/LF frequency range. The MEECN Message Processing Mode (MMPM) was developed under this project and is being implemented in the MEECN VLF/LF systems. A new High Data Rate (HIDAR) mode is under development. Increase in FY 92 funding is for HIDAR. Potential improvements in mode design and signal processing are continually being investigated for MEECN application. Independent assessment, T&E support, and MEECN oversight are provided to other MEECN-related developments and efforts such as the Navy's Non-Linear Adaptive Processor (NONAP) development and DCA-sponsored interoperability testing.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:
   a. (U) Held HIDAR combined SDR/PDR.
   b. (U) Identified method to improve HIDAR performance.
   c. (U) Successfully completed MMPM Program Performance Test for USAF's WIN and MPS.
   d. (U) Performed MMPM Acceptance Test for WIM & MPS.
   e. (U) Assessed NONAP performance and impact on receiver architecture.
2. (U) FY 1991 PROGRAMS:
   a. (U) Certify World-Wide Airborne Command Post (WABNCP) and Message Processing System (MPS) MMPM implementations.
   b. (U) Develop MMPM Upgrade and issue Mode Standard change pages.
   c. (U) Support NONAP T&E.
   d. (U) Restart HIDAR
3. (U) FY 1992 Plans:
   a. (U) Continue HIDAR development; hold CDR.
   b. (U) Support MMPM Upgrade implementation.
4. (U) FY 1993 Plans:
   a. (U) Complete HIDAR development; issue Mode Standard.
   b. (U) Support HIDAR implementations.
5. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORKED PERFORMED BY: IN-HOUSE: Lead Laboratory is NAVOCEANSYSCEN, San Diego, CA. CONTRACTORS: GTE, Government Systems Corporation, Needham Heights, MA and Technology Services Corporation, Santa Monica, CA.

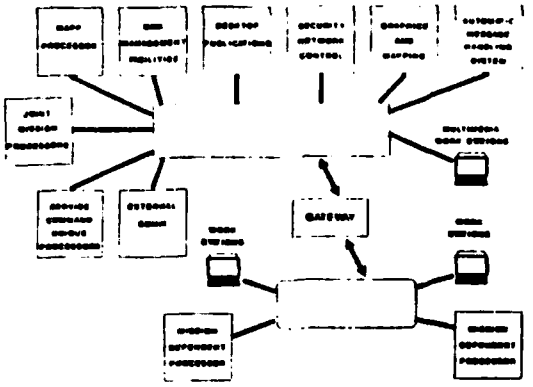
E. (U) RELATED ACTIVITIES: PE 0101402N, Navy Strategic Communications (Shore-to-Ship Communications Project X1083) contains VLF/LF systems into which improvements, developed under the MEECN project, will be incorporated.

F. (U) OTHER APPROPRIATION FUNDS: O&MN funds are used for software support and configuration management of the improvements developed under the MEECN RDT&E,N.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0303152N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: WWMCCS Information System (WIS)
PROJECT NUMBER: X1798 PROJECT TITLE: WIS Modernization



WWMCCS ADP TARGET ARCHITECTURE

POPULAR NAME: WWMCCS ADP Modernization (WAM)

A. (U) SCHEDULED/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	To Complete
Program Milestone		WAM DAB MS-III 2 QTR			Continuing
Engineering Milestones		CDR Incs I&II	Begin Dev Inc II	Comp NWSUS Inc I	Continuing
T&E Milestones				OPEVAL/TECHEVAL Inc I	Continuing
Contract Milestones				Deliver Inc I	Continuing

BUDGET	FY 1990	FY 1991	FY 1992	FY 1993	Program Total to Complete
Major Contract	4,740	3,055	3,318	3,099	Continuing
Support Contract	1,196	870	1,062	939	Continuing
In-House Support	50	15	15	15	Continuing
GFE/ Other	40	40	40	20	Continuing
TOTAL	6,026	3,980	4,435	4,073	Continuing

PROGRAM ELEMENT: 0303152N **BUDGET ACTIVITY:** 3
PROGRAM ELEMENT TITLE: WWMCCS Information System (WIS)
PROJECT NUMBER: X1798 **PROJECT TITLE:** WIS Modernization

B. (U) DESCRIPTION: WWMCCS is an operational, strategic, multi-service/agency program which provides Command and Control (C2) support to the National Command Authority (NCA) and the Joint Staff (JS) by providing Command, Control, and Communications (C3) data processing capabilities, including status of forces and support requirements for use in national security decision making, force preparation and operations planning execution.

(U) The Defense Communications Agency (DCA) is the executive agency for the Joint WWMCCS ADP Modernization (WAM) program. DCA has been directed by the JS to develop and implement the Joint Operation Planning and Execution System (JOPES). During this development the JOPES will be tested and installed in eleven versions. Some WAM hardware must be installed in order to support the software development. In addition, replacement of some software and hardware will ensure standardization and compatibility in the joint community. JOPES is the driver of the joint WWMCCS/WAM effort and the Navy must meet the joint service schedule or Navy supported sites will be unable to participate in strategic and joint warfighting requirements in support of the NCA and JS.

(U) The Navy WAM Site Unique Software (NWSUS) is a software modernization in Ada to provide improved maintainability, reusability, and portability. The software is being modernized in three increments with each increment consisting of two phases. Increment I will modernize seven systems; Increment II will modernize one system and Increment III will modernize two systems. The first phase will re-design the COBOL systems using the Ada language. The second phase will port the software to the standard WWMCCS ADP workstation providing automated interfaces between NWSUS and the Joint Operations Planning and Execution System (JOPES). These automated interfaces will keep NWSUS in synch with the incremental versions of JOPES as they are released twice yearly, allowing NWSUS users to access the JOPES-redefined WWMCCS standard reference files and database without costly software modifications.

PROGRAM ELEMENT: 0303152N **BUDGET ACTIVITY: 3**
PROGRAM ELEMENT TITLE: WWMCCS Information System (WIS)
PROJECT NUMBER: X1798 **PROJECT TITLE: WIS Modernization**

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

a. (U) Began design of NWSUS Increment II software for USCINCPAC.
b. (U) Completed NWSUS TEMP and Increment I test plans.
c. (U) Continued technical review of JOPES versions software design and test specifications.
d. (U) Continued design of NWSUS Increment I software for USCINCPAC, COMUSKOREA, and USCINCLANT.

2. (U) FY 1991 Program:
a. (U) Complete Design of NWSUS Increment I software for USCINCPAC, COMUSKOREA and USCINCLANT.
b. (U) Begin development and testing of NWSUS Increment I software for USCINCPAC, COMUSKOREA, AND USCINCLANT.
c. (U) Complete design of NWSUS Increment II software for USCINCPAC.
d. (U) Begin development and test of NWSUS Increment II software for USCINCPAC.
e. (U) Continue technical review of JOPES versions software design sepecifications.
f. (U) Complete NWSUS Increment II test plan.

3. (U) FY 1992 Plans:
a. (U) Continue development and test of NWSUS Increment I software.
b. (U) Continue technical review of JOPES versions software design specifications.

4. (U) FY 1993 Plans:
a. (U) Complete Technical Evaluation, installation, and Operational Evaluation of NWSUS Increment I at USCINCPAC, USCINCLANT, and COMUSKOREA.
b. (U) Continue development and test of NWSUS Increment II.
c. (U) Begin design of NWSUS Increment III software at USCINCLANT and USCINCPAC.
d. (U) Continue technical review of JOPES versions software design specifications.

5. (U) Program to Completion: This is a continuing program.
a. (U) Begin development, test and install Increment III.
b. (U) Port software version to the standard Joint workstations and databases.

D. (U) WORK PERFORMED BY:

IN HOUSE: NAVOCEANSYSCEN San Diego, CA and COMOPTEVFOR Norfolk, VA.
CONTRACTORS: Andrulis Research Corporation, Bethesda, MD; Advance Technology Inc., Reston, VA; Booz-Allen Hamilton, Bethesda, MD; Planning Research Corp., McLean, VA.

PROGRAM ELEMENT: 0303152N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: WWMCCS Information System (WIS)
PROJECT NUMBER: X1798 PROJECT TITLE: WIS Modernization

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) Technology Changes: None
2. (U) Schedule Changes: None
3. (U) Cost Changes: None

F. (U) PROGRAM DOCUMENTATION:

- o JMENS 06/82
- o WAM DCP 10/89
- o ILSP 09/90
- o WAM JOINT TEMP 04/90
- o NWSUS TEMP (DRAFT) 10/90

G. (U) RELATED ACTIVITIES:

o PE 0303152F WWMCCS ADP Modernization (WAM), funds the Joint Program Management Office (JPMO).

o PE 0303154K (WAM), PE 0303151H (WWMCCS ADP), and PE 0902498M (Management Headquarters (ADMIN)) fund Joint WAM procurement for Defense Communications Agency, Defense Nuclear Agency, and the US Marine Corps respectively.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
PROCUREMENT						
OPN 147	509	69	11,646	10,936	Cont.	Cont.
OPN(BA7)	1,668	0	0	0	Cont.	Cont.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None

J. (U) TEST AND EVALUATION DATA: Not applicable.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0303401N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Communications Security

A. ( ) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X0734	COMSEC R&D						
X1237	TEMPEST OP						
	TOTAL						

B. (U) DESCRIPTION: The goal of the Navy Communications Security (COMSEC) program is to ensure the continued protection of Navy and Joint communications systems from hostile exploitation. The program accomplishes this by: analyzing and evaluating currently deployed and developmental Communications, Command and Control Information (C3I) and Electronic Warfare (EW) systems to identify vulnerabilities; developing and testing new cryptographic equipments, systems and techniques; and developing equipment and techniques for testing operational and developmental equipment in order to protect against compromising emissions. The current emphasis is on achieving an interoperable, more secure electronic key distribution capability among Army, Navy and Air Force. Beginning in FY 1992, the TEMPEST Operational Development project (X1237) will be incorporated into project X0734.

PROGRAM ELEMENT: 0303401N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Communications Security
PROJECT NUMBER: X1237 PROJECT TITLE: TEMPEST OP Development

C. (U) DESCRIPTION: The TEMPEST OP Development project identifies, develops and evaluates (a) new test equipment and techniques for use in TEMPEST investigations of operational and developmental Navy systems and equipments and (b) equipment and techniques to improve the quality of, and decrease the time required for, analysis of signals detected during TEMPEST testing.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. ( ) FY 1990 ACCOMPLISHMENTS:

a. ( ) Initiated the development of an applique for the for use as a NONSTOP receiver.

b. ( ) Continued to provide support to the

c. ( )

d. (U) Completed development of the NONTUNABLE TEMPEST Receiver.

e. (U) Continued efforts in the development of the NAVAUTEMP II analysis system and an automated testing capability for TEMPEST laboratory testing.

2. (U) FY 1991 PROGRAM:

a. ( ) Complete the Feasibility Study phase of the NONSTOP applique development program.

b. ( )

c. ( ) Continue to provide support to the

d. (U) Continue developing tailored test and analysis instrumentation and techniques for the evaluation of operational and developmental Navy equipment and systems.

3. (U) FY 1992 PLANS:

a. ( ) This program will be incorporated intc

4. (U) FY 1993 PLANS:

a. (U) This program will be incorporated into

5. (U) FY 1994 THROUGH 1997 PLANS:

a. (U) This program will be incorporated into

6. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: In-House: NAVELEXSECCEN, Washington, DC.
Contractor: American Electronics Laboratory, Lansdale, PA.

F. ( ) RELATED ACTIVITIES: PE 0303401G.

G. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

H. (U) INTERNATIONAL COOPERATION AGREEMENTS: None.

PROGRAM ELEMENT: 0303401N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Communications Security
PROJECT NUMBER: X0734 PROJECT TITLE: Communications Security R&D

A. ( ) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X0734						

B. (U) DESCRIPTION: The Communications Security (COMSEC) Project analyzes existing COMSEC equipments and develops improved, interoperable communications security equipment and methods to protect classified communications from adversary exploitation. The project is a continuing effort to modernize obsolete cryptographic equipment and ancillaries with state-of-the-art replacements in order to meet the evolving threat. Replacement COMSEC, in most cases, will be implemented using embedded modules that plug into host equipment. The Navy COMSEC program will support the development of the host equipment, and will develop the embedded crypto modules (using Projects under COMSEC R&D development include: state-of-the-art secure voice communications equipment; support to communications systems such as High Speed Fleet Broadcast (HSFB), Compact VLF (CVLF), JTIDS/MIDS, Mini-DAMA, Tactical Air Combat Training System (TACTS), and the Navy Key Distribution System (NKDS) to secure Navy key variables; the Navy Single Point Keying System to centralize and automate distribution of cryptographic kev material; the Modular Security Device (MSD); and integrating KG-66/KGR-66/KGV-68

Note that the NKDS program is now included under which distributes and manages all the material typically held by Navy COMSEC custodians. The overall objectives of

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:

a. (U) Conducted NKDS systems design review and Preliminary Design Review (PDR).

b. ( ) Continued to procure the to support Navy weapon system R&D tests.

c. (U) Provided COMSEC R&D support to Navy communications systems: HSFB, JTIDS/MIDS, Mini-DAMA and TACTS.

d. (U) Began developing Over-The-Air Rekeying (OTAR) and Navy Net Planning software key management projects.

e. ( )

PROGRAM ELEMENT: 0303401N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Communications Security
PROJECT NUMBER: X0734 PROJECT TITLE: Communications Security R&D

2. (U) FY 1991 PROGRAM:

a. ( ) Continue to procure the] for application to Navy missiles, aircraft and associated subsystems and system integration to support Navy weapon system R&D tests.

b. (U) Conduct NKDS Critical Design Review (CDR).

c. ( )

d. (U) Conduct Laboratory test and evaluation of MSD prototype (an embedded crypto modules.)

e. (U) Begin developing acquisition package for KG-40A replacement embedded crypto module.

f. (U) Provide COMSEC R&D support to Navy communications systems using or developing embedded crypto modules: HSFB, JTIDS/MIDS, Mini-DAMA and TACTS.

g. (U) Continue OTAR and Net Planning Software development.

h. ( ) Conduct fleet tests and demonstrations of potential

3. (U) FY 1992 PLANS:

a. (U) Conduct DT-II (TECHEVAL) and OT-II (OPEVAL) for NKDS.

b. (U) Award KG-40A embedded crypto replacement module FSED contract.

c. (U) Provide COMSEC R&D support to Navy communications systems; HSFB. JTIDS/MIDS, Mini-DAMA and TACTS.

d. (U) Continue OTAR and Net Planning Software development.

e. (U) Continue developing tailored instrumentation and techniques for controlling compromising electro-magnetic emanations in Navy systems.

4. (U) FY 1993 PLANS:

a. (U) Achieve MS-III approval for production for NKDS and begin pre-planned product improvement.

b. (U) Complete Preliminary Design Review (PDR) and Critical Design Review (CDR) for KG-40A replacement embedded crypto module.

c. (U) Provide COMSEC R&D support to Navy communications systems: HSFB, JTIDS/MIDS, Mini-DAMA and TACTS.

d. (U) Continue OTAR and Net Planning Software development.

e. (U) Begin Developing acquisition package for Next Generation Telephone System.

f. (U) Continue developing tailored instrumentation and techniques for controlling compromising electro-magnetic emanations in Navy systems.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: In-house: Naval Research Laboratory

Washington, DC; Naval Electronic Systems Security Engineering Center, Washington, DC; Naval Ocean Systems Center, San Diego, CA; and Naval Electronics Systems Engineering Center, Portsmouth, VA. Contractors: SAIC San Diego, CA; Booz, Allen & Hamilton, Bethesda, MD

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY
PROGRAM ELEMENT: 0303401N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Communications Security
PROJECT NUMBER: X0734 PROJECT TITLE: Communications Security R&D

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
1. (U) Technology Changes: None.
2. (U) Schedule Changes: None.
3. (U) Cost Changes: None.

F. (U) PROGRAM DOCUMENTATION:

OR #06309483 Operational Requirement for STU-III	1/86
OR #14409486 for NKDS	3/87
COMSEC RESOURCES PROGRAM (CRP)	5/88
AP for NKDS	10/88
TEMP #511-01 for NKDS	2/90

G. ( ) RELATED ACTIVITIES: Program Element 0303401G,

H. ( ) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT						
OPN #143 (52TZ)					CONT	CONT
OPN #142 (52NR)					CONT	CONT
OPN #154 (52N4)					CONT	CONT

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

J. ( ) MILESTONE SCHEDULE:

MAJOR MILESTONES	M/S II	M/S III	IOC
Navy Key Dist System	4/Q FY89	2/Q FY93	
Navy Net Planning	4/Q FY92	3/Q FY93	
Electronic Key Delivery	4/Q FY92	3/Q FY95	
BITS	4/Q FY92	1/Q FY96	

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY
PROGRAM ELEMENT: 0303603N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Milstar Satellite Communication System
PROJECT NUMBER: X1880
PROJECT TITLE: Milstar Joint Terminal Program Office (JTPO)

A. (U) RESOURCES: (Dollars in Thousands)

PROJ NO	TITLE	FY1990 ACTUAL	FY1991 ESTIMATE	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROG
X1880	Milstar JTPO	5,001	0	3,534	2,515	Cont.	Cont.

B. (U) DESCRIPTION: The Milstar program is comprised of satellites, control stations, and airship/land terminals to provide worldwide, secure, anti-jam, survivable communications for the National Command Authority, Specified/Unified CINCs, and operational commanders. The Milstar JTPO coordinates and directs the development of user terminals by (1) ensuring terminal interoperability, (2) joint integrated logistics support (ILS) planning, (3) conducting joint interoperability testing, (4) writing terminal specifications and standards, (5) monitoring service terminal designs and (6) providing technical support to OSD, OJCS, CINCs and users.

c. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:
   a. (U) Coordinated development of interoperable terminal protocols.
   b. (U) Updated Joint ILS Plan and Joint Training Plan.
   c. (U) Conducted joint-service interoperability testing and demonstrations.
   d. (U) Updated joint terminal specifications and standards.
   e. (U) Audited Army/Navy/Air Force terminal designs.
   f. (U) Published/distributed Milstar User Bulletins to CINCs & service users.
2. (U) FY 1991 PROGRAM: Not applicable
3. (U) FY 1992 PLANS: Continue ongoing efforts in six JTPO task areas: (1) terminal interoperability; (2) joint ILS planning; (3) joint interoperability testing; (4) terminal specs and standards; (5) terminal configuration control; (6) OSD/OJCS/CINC/user support.
4. (U) FY 1993 PLANS: Continue ongoing efforts in 6 JTPO task areas.
5. (U) PROGRAM TO COMPLETION:
   a. (U) Continue ongoing efforts in six JTPO Task areas
   b. (U) Transition JTPO responsibilities to AFSPACECOM (System Operator).
   c. (U) This is a continuing program.

D. (U) WORK PERFORMED BY:

1. (U) IN HOUSE: Naval Ocean Systems Center (NOSC), San Diego, CA and A.F. Wright Research Center, Dayton, OH.
2. (U) CONTRACTOR: Booz, Allen & Hamilton, Bethesda, MD.

E. (U) RELATED ACTIVITIES: PE 0604577N, Navy SatCom Terminals.
F. (U) OTHER APPROPRIATION FUNDS: None.
G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

UNCLASSIFIED

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0305111N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Weather Service
PROJECT NUMBER: X0523 PROJECT TITLE: SATDAT

A. (U) RESOURCES: (Dollars in thousands)

PROJECT TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGR
X0523 SATDAT	971	1,079	1,122	1,144	Cont.	Cont.

B. (U) DESCRIPTION: This project develops software which enables satellite data to be used by global, regional and tactical oceanographic/atmospheric analysis and prediction models. It also supports software portability studies and rehosting of prediction models from other sources. It also supports modifications to the Tactical Environmental Support Systems - TESS(3) - Data Base Management System (DBMS) and Man-Machine Interface (MMI). Also supported under this project is the linking of new DBMS techniques to the existing AN/SMQ-11 system and development of the capability to integrate atmospheric sounder and DMSP Special Sensor Microwave Imager (SSM/I) data.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:
   a. (U) Linked DBMS techniques with AN/SMQ-11 and TESS(3).
   b. (U) Designed/developed user graphic interface utilities.

2. (U) FY 1991 PROGRAM: Begin developing capability for integrating atmospheric sounder and SSM/I data; begin modifications to TESS(3) DBMS and MMI; begin development of multi-sensor, multi-satellite applications software for TESS(3) and large scale computer.

3. (U) FY 1992 PLANS: Continue developing capability for integrating atmospheric sounder and SSM/I data; continue modifications to TESS(3) DBMS and MMI; continue development of multi-sensor, multi-satellite applications software for TESS(3) and large scale computer.

4. (U) FY 1993 PLANS: complete developing capability for integrating atmospheric sounder and SSM/I data; complete modifications to TESS(3) DBMS and MMI; begin development of next generation DBMS.

5. PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NOARL, Bay St. Louis, MS.

E. (U) RELATED ACTIVITIES: PE 0603704N, ASW Oceanography; PE 0604230N, Warfare Support Systems.

F. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0305160N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Defense Meteorological Satellite Program (DMSP)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PGRM
X0524	DMSP	1143	1288	1298	1281	Cont.	Cont.
X1452	GEOSAT	1617	2894	11797	16993	4056	42,885
TOTAL		2760	4182	13095	18274	Cont.	Cont.

B. (U) BRIEF DESCRIPTION OF PROGRAM ELEMENT: This program element funds the development of space based systems designed to measure atmospheric and oceanographic parameters. The goal is to improve the capability to monitor, predict, and provide the operating forces with environmental intelligence. The program element includes two programs - the Defense Meteorological Satellite Program (DMSP) and Geodetic/Geophysical Satellite (GEOSAT) program: (1) The DMSP is a Joint Service Use Program which provides primarily meteorological information. The Air Force is Executive Agent for DMSP. The main Navy thrust has been to provide a passive microwave imager on the satellite which provides atmospheric moisture, surface wind speed, and ice data. A major upgrade called Block 6 is being developed by DMSP Joint Program Office and will cover the ten year period, FY 2005 to FY2015. The Navy will commence its part of the risk reduction portion of the Block 6 upgrade in FY 1994. During risk reduction the Navy will investigate various Navy "options" sensors to be added to the baseline Block 6 design in support of Antisubmarine Warfare (ASW) oceanography. The investigations will look towards reduction in cost and technical risk. Based upon the results of risk reduction, the remaining RDT&E funding will be applied to Full Scale Engineering Development Block 6 prototype satellite to be contracted in FY 1997. (2) GEOSAT has been providing ocean topography information from a single satellite which was launched in 1985 and stopped operating in January 1990. In FY 1991, the Navy will start to develop a follow-on capability to provide the required ocean topography information after FY 1994 via the GEOSAT follow-on program (GFO). GFO will provide ocean topography, wind speed, sea heights and ice edge location information.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0305160N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Defense Meteorological Satellite Program (DMSP)
PROJECT NUMBER: X0524 PROJECT TITLE: DMSP - Navy Support

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PGRM
X0524	DMSP	1143	1288	1298	1281	Cont.	Cont.

B. (U) DESCRIPTION: This project provides Navy support to DMSP under an Air Force/Navy/Army Memorandum of Agreement (MOA). It funds Navy efforts associated with the special sensors located on the Defense Meteorologic Satellite Program (DMSP) satellite as well as other efforts, such as Block 6 risk reduction. As a result of the risk reduction, Navy options will be incorporated in the Full Scale Engineering Development (FSED).

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:
a. (U) Completed installation of improved Special Sensor Microwave/Imager (SSM/I) software algorithms at Fleet Numerical Oceanography Center (FNOC).

2. (U) FY 1991 PROGRAM: Continue study of space-based sensors and data processing methods.

3. (U) FY 1992 PLANS: Continue technological improvements study of space-base sensors and data processing methods.

4. (U) FY 1993 PLANS: Continue airborne oceanographic measurements and simulations of proposed Navy option sensors; monitor Air Force Block 6 efforts.

5. PROGRAM TO COMPLETION: Initiate Navy Block 6 Risk Reduction (FY 1994 - 1997).

D. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, DC; NSSA, Los Angeles, CA; CONTRACTOR: Hughes, Los Angeles, CA; Harris, Melbourne, FL; Aerojet, Sunnyvale, CA; GE, Morristown, NJ; and Westinghouse, Baltimore, MD.

UNCLASSIFIED

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0305160N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Defense Meteorological Satellite Program (DMSP)
PROJECT NUMBER: X0524 PROJECT TITLE: DMSP - Navy Support

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET

1. TECHNOLOGY CHANGES: The DMSP incorporates State-of-the-Art solid-state high power devices for use in the altimeter and scatterometer and their respective processors to be part of the Navy unique oceanographic instruments for Block 6 and extend the lifetime for Block 6.

2. SCHEDULE CHANGES: Two year delay in DMSP Block 6.

3. COST CHANGES: None.

F. (U) PROGRAM DOCUMENTATION:

NAPDD	230-94	05 FEB 90
OR	268-94-92	18 Sep 90

G. (U) RELATED ACTIVITIES: PE 0305160F, Air Force DMSP; PE 0604218N, Air/Ocean Equipment Engineering.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PRGRM
(U) WPN	0	0	0	0	381500	381500

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

J. (U) MILESTONE SCHEDULE:

Block 6 Risk Reduction - Air Force RFP Release	Jan 91
Block 6 Risk Reduction - Navy Option Award	Nov 94
Completion of Navy Block 6 Risk Reduction	Jan 97
Award of Navy Option for DMSP FSD	Nov 97

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0305160N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Defense Meteorological Satellite Program (DMSP)
PROJECT NUMBER: X1452 PROJECT TITLE: Geodetic/Geophysical Satellite

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PGRM
X1452	GEOSAT	1617	2894	11797	16993	4056	42,885

B. (U) DESCRIPTION: This project provides the means to obtain ocean topography measurements from which front, eddy, and current data are derived to increase the effectiveness of anti-submarine and undersea warfare operations. The data was provided by the Geodetic/Geophysical Satellite (GEOSAT) through January 1990 when it failed. Starting in FY 1991 the Navy will begin development of an operational altimetry capability GEOSAT Follow-On (GFO) for launch in FY 1994. GFO will provide altimetry until DMSP Block 6 becomes operational.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:
   a. (U) Completed GEOSAT on-orbit operations.
   b. (U) Initiated planning for GFO acquisition.

2. (U) FY 1991 PROGRAM: Complete in-house preliminary design.

3. (U) FY 1992 PLANS: Initiate satellite development.

4. (U) FY 1993 PLANS: Continue satellite development.

5. PROGRAM TO COMPLETION: Complete satellite development (FY 1994); launch prototype satellite (FY 1994).

D. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Wash., DC; NSWC, Dahlgren, VA; CONTRACTOR: APL/JHU.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET

1. TECHNOLOGY CHANGES: The GFO incorporates the State-of-the-Art solid-state high power devices to extend the satellite lifetime.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY
PROGRAM ELEMENT: 0305160N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Defense Meteorological Satellite Program (DMSP)
PROJECT NUMBER: X1452 PROJECT TITLE: Geodetic/Geophysical Satellite

2. SCHEDULE CHANGES: Due to the unexpected failure of GEOSAT in FY 90, the program has been restructured to design and develop an operational altimetry capability GEOSAT Follow-on (GFO) for launch in FY 94.

3. COST CHANGES: None.

F. PROGRAM DOCUMENTATION:
NAPDD 217-094 5 JUNE 90
OR 217-094-92 18 Oct 90

G. (U) RELATED ACTIVITIES: PE 0305160F, Air Force DMSP; PE 0604218N, Air/Ocean Equipment Engineering.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

		FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PRGRM
(U)	WPN	0	0	0	0	60000	60000
	OPN	0	0	204	208	2500	2912

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

J. (U) MILESTONE SCHEDULE:

Begin Preliminary Design Efforts	01/91
Release RFP for follow-on Satellite	03/91
Milestone II	09/91
Begin Follow-on Satellite Development	10/91
Launch Prototype Satellite	09/94
Milestone III	12/94

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0601152N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: In-House Laboratory Independent Research

A. (U) RESOURCES: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROG.
OCEAN SCI.	1,640	1,627	1,742	1,836	CONT.	CONT.
INFO. SCI.	1,761	1,747	1,872	1,971	"	"
ADV. MATLS.	2,607	2,585	2,771	2,917	"	"
SUST. PROG.	18,328	18,176	19,483	20,510	"	"
PE TOTAL	24,336	24,135	25,868	27,234	"	"

B. (U) DESCRIPTION:
This element provides the primary means for Navy R&D Center directors to strengthen in-house capabilities and to initiate high-risk, high-payoff research relevant to their respective missions and to the needs of the Navy. A prime objective is to enhance the creativity and productivity of in-house R&D Centers, and to attract and retain talented and creative scientists and engineers. Research is identified in those fields of science most closely related to the Navy's mission (reflected in the ONR Research Investment Strategy) and on new concepts relevant to future Navy requirements (ONR Thrust areas of Ocean Sciences, Information Sciences, and Advanced Materials, plus the overall Sustaining Program); consideration is also given to relevance to the DOD Critical Technologies (CT). Efforts are peer-reviewed, biennially.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:
Examples are listed by ONR Research Investment Strategy emphasis; DOD CT, where applicable, are noted in parentheses.

1. (U) FY 1990 Accomplishments:

a. (U) Ocean Sciences--Developed relationships that quantify impact of sensor position and sound speed mismatch on detection performance (CT: Weapon System Environment).

b. (U) Information Sciences--Designed a multiple partitioned m-dimensional computer memory architecture. Improved methods for computing steady flow about a ship (CT: Parallel Computer Architectures).

c. (U) Advanced Materials--Explored use of thin film technology and high-temperature superconductors for magnetic gradiometry. Improved performance and long-term stability of electrochromic light-attenuation devices (CT: Superconductivity and Photonics).

d. (U) Sustaining Program--Applied recently developed concepts and tools of "chaos" theory and found that real broadband acoustic signatures of submarines are nonlinear in character. Lays basis for novel signal analysis for nonlinear dynamical signals, even in the presence of a large noise background.

PROGRAM ELEMENT: 0601152N **BUDGET ACTIVITY:** 1
PROGRAM ELEMENT TITLE: In-House Laboratory Independent Research

2. (U) FY 1991 Program:

a. (U) Ocean Sciences--signal processing for target discrimination in sonar clutter. Matched field processing for Arctic acoustic detection (CT: Signal Processing and Simulation & Modeling).

b. (U) Information Science--development of a unified theory for data fusion. Radar scattering and target discrimination (CT: Data Fusion and Signature Control).

c. (U) Advanced Materials--properties of high temperature ceramic superconductors. Transient crack growth in structural steels. Tunable solid state laser materials for countermeasures devices. Use of scanning tunneling microscopy for evaluation of semiconductors. Interactions of electron beams and radiation with matter, for damage assessment (CT: Superconductivity, Photonics and Semiconductor Materials & Microelectronic Circuits).

d. (U) Sustaining Program--adaption and standardization of highly sensitive assay systems for detection of xanthine oxidase and dehydrogenase in the brain. Important implications for treatment of cerebral ischemia.

3. (U) FY 1992 Plans:

a. (U) Ocean Sciences--sound propagation modeling (CT: Weapon System Environment).

b. (U) Information Sciences--robust methods for tactical missile computations (CT: Data Fusion and Simulation & Modeling).

c. (U) Advanced Materials-- electrochemistry of batteries. Diamond semiconductor film material deposition. Amplification of trace atmospheric elements in detection; science of superlattices of narrow band-gap semiconductors. Interactions of acoustic, electromagnetic, and elastic waves with materials (CT: Semiconductor Materials & Microelectronic Circuits).

d. (U) Sustaining Program--high power millimeter wave tube technology (for communications, radar, tracking); radiation, space charge, and field effects in charged particle beams; energy storage research for pulsed power (CT: Signature Control and Pulsed High Power).

4. (U) FY 1993 Plans:

a. (U) Ocean Sciences--investigation of fluid flow phenomena which are related to various tactical and strategic weapons operations/warhead design, and the development of mathematical methodologies for these investigations (CT: Computational Fluid Dynamics).

PROGRAM ELEMENT: 0601152N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: In-House Laboratory Independent Research

b. (U) Information Sciences--investigation of the areas of artificial intelligence, advanced filtering techniques, information handling, and computer systems architectures that may lead to smart weapons, highly adaptive systems, and improved Naval strategy (CT: Machine Intelligence/Robotics, Signal Processing and Parallel Computer Architectures).

c. (U) Advanced Materials--fundamental studies on materials with potential for major improvements in effectiveness of Navy weapons systems, ordnance, strategic/space systems. Investigation of those phenomena and materials, that are likely to lead to lighter-weight permanent magnets (CT: High Energy Density Materials).

d. (U) Sustaining Program--investigation of those phenomena involving propagation of charged particles for beam weapons and millimeter radiation (CT: Pulsed High Power).

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NOSC, San Diego, CA; NUSC, Newport, RI; NSWC, Dahlgren, VA; NWC, China Lake, CA; DTRC, Bethesda, MD; NCEL, Port Hueneme, CA; NADC, Warminster, PA; NCSC, Panama City, FL; and several other Navy R&D Centers and facilities engaged in medical and other specialized areas of research.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.
2. (U) Schedule Changes: Not applicable.
3. (U) Cost Changes: Not applicable.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: Program Element 0601153N, Defense Research Science; Program Element 0602111N, AAW/ASUW Technology; Program Element 0602234N, System Support Technology; Program Element 0602314N, Antisubmarine Warfare; Program Element 0602936N, Independent Exploratory Development.

H. (U) OTHER APPROPRIATION FUNDS: None.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0601153N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: Defense Research Sciences

A. (U) RESOURCES: (Dollars in Thousands)

ONR THRUST	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Ocean Sci.	102,067	108,017	115,699	122,413	CONT.	CONT.
Info. Sci.	30,288	31,539	32,042	32,823	"	"
Adv. Matls.	32,408	36,310	37,211	37,752	"	"
Sustain Pgm.	173,873	193,388	210,815	223,690	"	"
PE TOTAL	338,636	369,254	395,767	416,678	"	"

B. (U) DESCRIPTION: The purpose of this element is to sustain U.S. naval scientific and technological superiority, to provide new concepts and technological options for the maintenance of naval power and national security, and to afford the means to avoid scientific surprise. The Program is guided by the ONR Research Investment Strategy, such that research efforts support naval warfare requirements and the DOD Critical Technologies. The ONR Research Investment Strategy emphasizes Ocean Sciences, Information Sciences, and Advanced Materials. An example of the Ocean Sciences emphasis and support of Anti-Submarine Warfare (ASW) and Power Projection (Navy priorities), is the Special Research Program (SRP) in Underwater Acoustics Reverberation. The SRP focuses on understanding of the physics of underwater sound propagation associated with future naval systems as well as strongly supporting the Weapon System Environment and Simulation & Modeling DOD Critical Technologies. The Sustaining portion of the ONR investment is directed toward maintenance of scientific superiority and provision of scientific options which may prevent, as well as create, scientific and technological surprise. Sustaining efforts support a diversity of other initiatives from cost reduction to operation and improvement of research ships and submersibles. Program funds reflect a Navy decision to effect real growth in the tech base, consistent with administration policy and Congressional direction, and despite reductions elsewhere in Navy programs.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

Examples are listed by ONR Research Investment Strategy emphasis; DOD Critical Technologies (CT), where applicable, are noted in parentheses.

1. (U) FY 1990 Accomplishments:

a. (U) Ocean Sciences: Developed a unified theory of acoustic wave propagation that incorporates bathymetry in its predictions; has implications for ASW and oil exploration (CT: Weapon System Environment and Simulation & Modeling).

b. (U) Information Sciences: An active control approach for surge cancellation in jet engines that eliminates the problem of rotating stall in axial flow turbines, in less than a single rotation of the rotor, demonstrated and transitioned to Pratt Whitney and GE (CT: Air Breathing Propulsion).

PROGRAM ELEMENT: 0601153N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: Defense Research Sciences

c. (U) Advanced Materials: Two orders of magnitude increase in dynamic fracture resistance achieved with a composite intermetallic material.The fibers used in the composites were composites themselves. Commercial implications to the automotive and aviation industries with regard to body, components, engines (CT: Composite Materials).

d. (U) Sustaining Program: Optical interferometry approach produces 4 orders of magnitude improvement in imaging and location of stellar sources; provides foundation for next generation navigation systems (CT: Passive Sensors). Magnetometer investigations associated with ASW revealed strong very low frequency magnetic activity several hours prior to the Loma Prieta, 17 October 1989 earthquake; potential for reliable, advance warning of future earthquakes in a region is possible. Instruments are being placed in California fault regions in conjunction with USGS (CT: Passive Sensors).

2. (U) FY 1991 Program (new initiatives):

a. (U) Ocean Sciences: Efforts will be initiated in high resolution remote sensing; bioacoustic signal classification; marine aerosols; dynamics of bubbly flows; air/sea interaction; marine aggregate particle dynamics; and Kuroshio extension regional experiment (CT: Weapons System Environment and Simulation & Modeling).

b. (U) Information Sciences: Efforts will be initiated in fast optoelectronics; multicomputers; and neural constraints on cognitive architecture (CT: Photonics, Parallel Computer Architectures and Machine Intelligence & Robotics).

c. (U) Advanced Materials: Efforts will be initiated in mechanisms of high temperature superconductivity and methods for fabricating practical materials; topics in solid state electronics and systems/communication theory; investigation of materials fracture at the atomistic level; corrosion of composites; energetic materials synthesis and reaction dynamics; and structures/functions of macromolecules for possible use as sensors (CT: Superconductivity, Semiconductor Materials, Composite Materials, High Energy Density Materials and Passive Sensors).

d. (U) Sustaining Programs: Efforts will be initiated in innovative approaches for treating combat casualties; high current charged particle beam propagation physics; biodetection of trace-level metals in the sea; and evaluation of the interaction of electromagnetic energy with biological systems. Graduate and undergraduate fellowships in areas of critical Navy importance (e.g., acoustics) will be initiated.

3. (U) FY 1992 Plans (new initiatives):

a. (U) Ocean Sciences: New initiatives on the nonlinear dynamics of ocean waves; and marine aerosol distribution, extinction and conversion (CT: Weapons System Environment and Simulation & Modeling).

b. (U) Information Sciences: New initiatives to investigate design and construction of verifiably correct complex software systems and parallel scientific computer architectures; hydrodynamically induced propulsor signatures; and neural networks (CT: Software Producibility, Parallel Computer Architectures, Signature Control and Machine Intelligence & Robotics).

PROGRAM ELEMENT: 0601153N **BUDGET ACTIVITY:** 1
PROGRAM ELEMENT TITLE: Defense Research Sciences

c. (U) Advanced Materials: New initiatives to study advanced infrared materials; molecular design and fabrication of films on surfaces; vibronics and energy transfer in rare earth solid state laser materials; electronic interactions in highly correlated systems; superconducting materials; chemistry of new composite materials; polycyclic materials for propellants and explosives; biopolymeric materials; and molecular engineering of biomaterials (CT: Passive Sensors, Superconductivity, Composite Materials and Biotechnology Materials).

d. (U) Sustaining Programs: New initiatives to study sensory-driven motor control in biological systems; real neuron computation (CT: Machine Intelligence & Robotics); nonlinear dynamics/chaos/difractals; design of enzymes through new biocatalysts; computational fluid dynamics; reliability/failure analyses; wound repair; neurobiological mechanisms of cold-induced amnesia; flares at solar maximum; and transient stimulated scattering effects.

4. (U) FY 1993 Plans (new initiatives):

a. (U) Ocean Sciences: Biot theory propagation models; marine biotechnology; eddy mixing; free surface interactions; optical signals; and zooplankton patch dynamics (CT: Weapons System Environment and Simulation & Modeling).

b. (U) Information Sciences: Studies of chip level architectures; non-linear stochastics; parallel systems; shell collapse; structural complexity; and systolic architecture (CT: Parallel Computer Architectures and Simulation & Modeling).

c. (U) Advanced Materials: Research on polymer physics; superconductors; and textured metals (CT: Superconductivity and Composite Materials).

d. (U) Sustaining Programs: Neural network-based mechanical diagnostics (CT: Machine Intelligence).

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: The Defense Research Sciences Element is managed by the Office of Naval Research. The performers include various universities (about 53% of funding), industry and not-for-profit institutions (13%), and Navy laboratories (34%).

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.
2. (U) Schedule Changes: Not applicable.
3. (U) Cost Changes: Not applicable.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: PE 0602111N, AAW/ASUW Technology; PE 0602121N, Surface Ship Technology; PE 0602122N, Aircraft Technology; PE 0602234N, System Support Technology; PE 0602314N, Antisubmarine Warfare; PE 0603207N, Air/Ocean Tactical Applications; PE 0603785N, ASW Environmental Acoustic Support; PE 0601152N, In-House Laboratory Independent Research; PE 0601102A, Army Defense Research Sciences; PE 0601102F, Air Force Defense Research Sciences.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602111N BUDGET ACTIVITY: 1

PROGRAM ELEMENT TITLE: ANTI-AIR/ANTI-SURFACE WARFARE TECHNOLOGY

PROJECT NUMBER: N.A. PROJECT TITLE: N.A.

A. (U) RESOURCES: (Dollars in Thousands)

TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMP.	TOTAL PROGRAM
Anti-Air/Anti-Surface Warfare Technology	65,825	67,232	70,517	72,339	Cont.	Cont.

B. (U) DESCRIPTION: This program supports future surveillance and weapons systems for surface, air, and space platforms for Navy missions in Anti-Air and Anti-Surface Warfare. Anti-Air Warfare requires surveillance and intercept capabilities to counter the threat in a multi-polar world with a globally dispersed Navy. It is also essential to develop innovative short-range defense technology to support ships in a reduced force structure. Anti-Surface and Strike Warfare requires enhanced launch stand-off, precision targeting, survivability, post-strike damage assessment and affordable munitions.

(U) This element supports the following DOD Critical Technologies: Microelectronics, Parallel Computer Architectures, Simulation and Modeling, Photonics, Sensitive Radars, Passive Sensors, Signal Processing, Signature Control, Data Fusion, Computational Fluid Dynamics, Air-Breathing Propulsion, High-Energy Density Materials and Composite Materials.

C. ( ) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. ( ) FY 1990 Accomplishments:

a. ( ) Point Defense: Completed optical control of phased arrays; formed tested demonstrated

b. ( ) Wide Area Surveillance: Completed hardware for quantified breadboarded for space.

c. ( ) Area Surveillance: Demonstrated digital sidelobe canceller; tested UHF adjunct radar antenna and transmitter; completed avionics sensor fusion flight tests; determined per Congressional direction.

d. ( ) Air Superiority Weapons: Fabricated a 5-18 Ghz, 200-element, solid-state active array antenna; tested a for an integrated guidance-fuze concept.

e. ( ) Area/Wide Area Defense Weapons: Breadboarded and tested

f. (U) ASUW/Strike Weaponry: Completed solid fuel-air warhead effort; breadboarded an integrated fiber-optic gyro on a chip.

2. (U) FY 1991 Program:

a. ( ) Point Defense: Develop concepts for multi-sensor point defense system; demo aerostat extended radar; begin complete multiple-target tracking experiments; complete window, line selection, and adaptive optics for high-power chemical laser.

b. ( ) Wide Area Surveillance: Continue wideband airborne early warning (AEW) radar test bed; complete lab testing of continue low-cost height-finding-direction finding (HFDF) and complete geo-location algorithms; develop techniques for

begin interferometry development.

c. ( ) Area Surveillance: Begin development of continue cooperation with USAF in air-target ID; conduct IR background data gathering, analysis and modelling; continue development of and target ID; begin counter-anti-radiation missile (ARM) investigations.

d. ( ) Air Superiority: Begin efforts for lock-on-after-launch guidance and control; begin diamond IR domes for high-speed and temperature missile flight; initiate fire-control radar.

e. ( ) Area/Wide Area Defense Weapons: Continue fabricate a kill assessment Cepstral processor; begin concept.

f. (U) ASUW/Strike Weaponry: conduct testing of a fiber-optic gyro on a chip; begin passive IR and active RF neural net ship classifier and aim-point selector.

g. (U) SEALAR: Conduct Sea Launch and Recovery test program.

3. (U) FY 1992 Plans:

a. ( ) Point Defense: Demo begin integration of radar/IR/electronic support measurements (ESM)/weapons for self-defense system; begin reactive case warhead development; assess electronic vulnerability to high rep-rate millimeter HPM.

b. ( ) Wide Area Surveillance: Complete surface ship continue fabricate wideband AEW radar; continue complete ship HFDF test hardware.

c. (U) Area Surveillance: Complete volume surveillance radar; continue IR/EO sensor, air target ID, IR background characterization, and counter-ARM efforts.

d. (U) Air Superiority: Breadboard wide band active array cued/supercued fire-control radar; fabricate 8-inch diameter integrated guidance-fuze active array antenna.

e. (U) Area/Wide Area Defense Weapons: Complete directional ordnance system investigation; complete real-time kill assessment Cepstral processor; complete ECM-resistant, frequency agile semi-active guidance concept; initiate magnetohydrodynamic (MHD) warhead.

f. (U) ASUW/Strike Weaponry: Complete fiber-optic gyro on a chip; demonstrate modular, reconfigurable missile computer; develop reduced-signature solid rocket propellant; begin technology for near-real-time mission planning for long-range precision strike cruise weapons.

g. (U) SEALAR: Assess results of Sea Launch and Recovery test program.

4. (U) FY 1993 Plans:

a. ( ) Point Defense: Complete complete integration of point defense sensors; continue environmental effects EM/EO analysis and modelling; identify low-cost self-defense weapon system technologies for non-combatants; down select to single compact accelerator concept for Charged Particle Beam weapon.

b. ( ) Wide Area Surveillance: Test wideband AEW radar; test low-cost shipboard HFDF system.

c. (U) Area Surveillance: Integrate and test point defense sensors;

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY
PROGRAM ELEMENT: 0602111N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: ANTI-AIR/ANTI-SURFACE WARFARE TECHNOLOGY
PROJECT NUMBER: N.A. PROJECT TITLE: N.A.

fabricate IR/EO sensor; demo automatic ship classifier; demo air-target ID algorithms; implement counter-ARM techniques; transition UHF adjunct radar.

d. (U) Air Superiority: Conduct hardware-in-the-loop (HWIL) simulations of lock-on-after-launch missile guidance & control components; conduct survivability tests on optical-quality diamond IR domes.

e. (U) Area/Wide Area Defense Weapons: Continue MHD warhead.

f. (U) ASUW/Strike Weaponry: Test autonomous anti-ship seeker; continue precision strike mission planning/autonomous guidance.

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN HOUSE: NADC, Warminster,PA; NOSC, San Diego, CA; NRL, Washington, DC; NSWC, Silver Spring, MD; NWC, China Lake, CA; CONTRACTORS: APL/JHU; MIT/LL; QuesTech Inc.; Texas Instruments; Riverside Research Institute; TRW; Ferranti; Westinghouse.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
1. (U) TECHNOLOGY CHANGES: Not applicable.
2. (U) SCHEDULE CHANGES: Not applicable
3. (U) COST CHANGES: Not applicable.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: PE 0603306N, Advanced Aircraft Air-to-Surface Missile; PE 0603609N, Conventional Munitions; PE 0603318N, Air-to-Air/Surface-to-Air Missile; PE 0602302F, Rocket Propulsion; PE 0602601F, Advanced Weapons; PE 0602602F, Conventional Munitions; PE 0602203F, Aerospace Propulsion; PE 0602234N, Systems Support Technology; 0603792N, Advanced Technology Transition; PE 0603742F, Combat Identification Technology.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands) None.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

J. (U) MILESTONE SCHEDULE: Not applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602121N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: SURFACE SHIP TECHNOLOGY
PROJECT NUMBER: N.A. PROJECT TITLE: N.A.

A. (U) RESOURCES: (Dollars in Thousands)

TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMP.	TOTAL PROGRAM
Surface Ship Technology	16,375	15,863	17,006	17,445	Cont.	Cont.

B. (U) DESCRIPTION: This element develops hull, machinery and electrical (HM&E) technology to (1) reduce detectability and targetability for all ships, (2) increase ability of ships to absorb combat damage and fight hurt, (3) increase ship volume of operations in all weather conditions and (4) allow more efficient, affordable warships. Project areas presently being pursued include: electromagnetic compatibility, signature reduction, advanced hull systems, damage control and advanced propulsion and machinery. Critical work is continuing in exploratory development electrical technology in support of the Navy's Electric Drive Initiative.

(U) This element supports the following DOD Critical Technologies: Robotics, Simulation and Modeling, Photonics, Passive Sensors, Signature Control, Computational Fluid Dynamics, Pulsed Power, Composite Materials, and Superconductivity.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

a. (U) Completed development of combined narrowband, wideband and frequency-hopping VHF/UHF transmitter models for electromagnetic interference analyses.

b. ( ) Completed model of steel-hulled ship for math model verification.

c. (U) Completed development of ice impact loading model for hull and appendages.

d. ( ) Completed topside spray icing prediction model and validated with sea trials.

e. ( ) Conducted feasibility demonstration of concept.

f. (U) Demonstrated smart power switch for integrated electric drive power distribution system.

g. ( ) Began construction of model for integrated electric drive enhancement.

h. (U) Initiated low-temperature superconducting propulsion technology effort.

2. (U) FY 1991 Program:

a. (U) Complete field algorithm for electrically thin magnetic and organic composite material systems.

b. ( ) Transition technology to advanced development for Mine Counter Measures (MCM) and Mine Sweeper Hunter (MSH)

c. ( ) Transition technology to funded demonstration program.

d. (U) Conduct at-sea testing of first breadboard of autonomous structural data acquisition system aboard T-AGOS-19.

e. ( ) Conduct test of sandwich

configuration deckhouse panel under continuing DNA, UK, Canada test series.

f. (U) Initiate control algorithm development for power distribution in integrated electric drive system.

g. (U) Complete concept evaluation and initial payoff demonstration of composite diesel engine.

h. (U) Utilize full-scale advanced development program shipboard test results to validate fire and smoke-spread model.

i. (U) Initiate development of electro-optic/electromagnetic environment monitoring concept.

3. (U) FY 1992 Plans:

a. (U) Initiate feasibility study of fuel cells for emergency ship power.

b. ( ) Transition double-hull structures and combination to advanced technology demonstration program.

c. ( ) Initiate development of concepts.

d. (U) Initiate interference model development for conformal multi-beam antenna array for extra-high-frequency satellite communication.

e. (U) Demonstrate feasibility of non-fluorocarbon fire-suppression agents.

f. (U) Complete analytical model for missile debris and residual fuel damage.

g. ( ) Transition to advanced development.

4. ( ) FY 1993 Plans:

a. ( ) Demonstrate coatings and to reduce radiated noise signatures.

b. (U) Demonstrate feasibility of low-observable glass-reinforced plastic stack and mast concepts.

c. (U) Complete cooperative effort with other NATO navies to improve dynamic stability of ships in rough seas.

d. ( ) Complete analytical model for hull forms.

e. (U) Demonstrate feasibility of minimizing magnetic signature of composite diesel engine.

f. (U) Complete shipboard smoke-spread analysis model.

g. (U) Transition damage-control sensor guidelines to ship combat survivability program.

h. (U) Complete ship dynamic stability guidelines.

i. (U) Demonstrate feasibility of advanced material transporter concept.

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: David Taylor Research Center, Bethesda, MD; Naval Research Laboratory, Washington, D.C.; Naval Ocean Systems Center, San Diego, CA; Naval Coastal System Center, Panama City, FL; Naval Oceanographic and Atmospheric Research Laboratory, Bay St. Louis, MS; CONTRACTORS: Ball Brothers Research Corporation, Boulder, CO; General Electric Company, Schenectady, NY; National Institute of Standards and Technology, Gaithersburg, MD; Oak Ridge National Laboratory, Oak Ridge, TN; Polimotors Corporation, Passaic, NJ; Purdue University, West Lafayette, IN; Seemann Composite Systems, Inc., Gulfport, MS; Texas A&M University, College

PROGRAM ELEMENT: 0602121N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: SURFACE SHIP TECHNOLOGY
PROJECT NUMBER: N.A. PROJECT TITLE: N.A.

Station, TX; University of Alberta, Alberta, Canada; University of Florida, Gainesville, FL; University of Houston, Houston, TX; Westinghouse, Pittsburgh, PA.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
1. (U) TECHNOLOGY CHANGES: Not applicable.
2. (U) SCHEDULE CHANGES: Not applicable.
3. (U) COST CHANGES: Not applicable.

F. (U) PROGRAM DOCUMENTATION: None.

G. (U) RELATED ACTIVITIES: PE0602131M, Marine Corps Landing Force Technology; PE0602233N, Mission Support Technology; PE0602234N, Systems Support Technology; PE0602315N, Mine and Special Warfare Technology; PE0602323N, Submarine Technology; PE0602936N, Laboratory Independent Exploratory Development; PE0603502N, Surface Mine Countermeasures; PE0603508N, Ship Propulsion Systems; PE0603513N, Shipboard Systems Component Development; PE0603514N, Shipboard Damage Control; PE0603553N, Surface Anti-Submarine Warfare; PE0603564N, Ship Development; PE0603573N, Electric Drive; and PE0603724N, Navy Energy Program.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands) None.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

J. (U) MILESTONE SCHEDULE: Not applicable.

UNCLASSIFIED

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602122N
PROGRAM ELEMENT TITLE: AIRCRAFT TECHNOLOGY
PROJECT NUMBER: N.A.

BUDGET ACTIVITY: 1
PROJECT TITLE: N.A.

A. (U) RESOURCES: (Dollars in Thousands)

TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMP.	TOTAL PROGRAM
Aircraft Technology	19,226	21,875	23,776	24,390	Cont.	Cont.

B. (U) DESCRIPTION: This program develops technology for naval aviation, with emphasis on the demands imposed by aircraft carrier flight operations and Marine Corps amphibious and field operations. This program exploits the emerging technologies of (a) composite and matrix materials for structures to reduce airframe and propulsion plant weight and the effects of saltwater corrosion; (b) reduced observable aerodynamic designs of Navy-unique aircraft components; (c) advanced gas turbine engine component designs for extended range/endurance; and (d) longer service life to bring about reduced at-sea replacements and spare inventory. Technologies are developed for needed upgrades to shipboard and arresting-gear-systems, visual landing aids for safer flight operations and aircraft maintenance test equipment for increased weapon system availability. The program provides mission area analysis and concept definition required for the Exploratory Development phase of air vehicle and weapon system program. Technologies are also developed for aviation test and evaluation systems.

(U) This element supports the following DOD Critical Technologies: Software Producibility, Parallel Computer Architectures, Robotics, Simulation and Modeling, Photonics, Passive Sensors, Signal Processing, Signature Control, Data Fusion, Computational Fluid Dynamics, Air-Breathing Propulsion, and Composite Materials.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

a. (U) Completed altitude performance and relight testing of a moderate-bypass-ratio engine exhaust augmenter.

b. (U) Evaluated aircrew performance using a cockpit articulating seat.

c. (U) Developed self-repair techniques for flight controls.

d. (U) Demonstrated lightweight, highly accurate weapon/sensor aiming aircrew head tracker.

e. (U) Transitioned aircraft structure large-area-of-repair technology to F-18.

f. (U) Completed detailed designed and tests of a swept aero core engine compressor.

g. (U) Designed a jet blast deflector suitable for current and future high-performance aircraft.

h. (U) Completed a study on incorporating an infrared scene generator without interference in a radio frequency test chamber.

2. (U) FY 1991 Program:

a. (U) Fabricate the swept aero core engine compressor.

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FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602122N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: AIRCRAFT TECHNOLOGY
PROJECT NUMBER: N.A. PROJECT TITLE: N.A.

b. (U) Develop a simulation model for cockpit scope capsules for future aircraft.
c. (U) Lab test miniature displays for helmet-mounted displays.
d. (U) Simulator test a Heads-Up Display Up-Front Control Panel.
e. (U) Demonstrate tip-jet nozzles for future vertical flight aircraft.
f. (U) Lab test high-temperature fuel injection for aircraft engines.
g. (U) Transition Test Generator with Inferred Reasoning to avionics test stations.
h. (U) Develop high-speed ring architecture for real-time test and evaluation data gathering for fleet exercises.

3. (U) FY 1992 Plans:
a. (U) Complete non-intrusive engine turbine inlet sensors testing.
b. (U) Evaluate performance of an integrated crewstation in a capsule.
c. (U) Test advanced helmet-mounted display visor optics.
d. (U) Design a flight-control system which incorporates neural networks.
e. (U) Develop hardware for generic autonomous vehicles for yellow gear application.
f. (U) Analyze future aircraft for the next-generation ships.
g. (U) Start developing the tactical utility of agility for Navy aircraft based upon DARPA's X-31A Enhanced Fighter Maneuverability aircraft.

4. (U) FY 1993 Plans:

a. (U) Complete Advanced Subsonic Turbine Engine Technology turbine design.
b. (U) Conduct a systems evaluation of the Advanced Technology Cockpit.
c. (U) Test the capabilities of flight controls against high-power microwaves.
d. (U) Transition aircraft battle damage technology to Navy repair and training facilities.

e. (U) Develop automated rapid aircraft-turn-around capability on carriers and air-capable ships.
f. (U) Complete X-31A agility development for Navy applications.

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: Naval Air Development Center, Warminster, PA; Naval Air Propulsion Center, Trenton, NJ; Naval Air Engineering Center, Lakehurst, NJ; David Taylor Research Center, Bethesda, MD; Naval Research Laboratory, Washington, DC; Naval Weapons Center, China Lake, CA; Naval Ordnance Station, Indian Head, MD. CONTRACTORS: General Electric, Lynn, MA; Grumman Aerospace Corporation, Bethpage, NY; McDonnell-Douglas Corporation, St. Louis, MO; Pratt-Whitney Engines, East Hartford, CT; Rockwell International, Columbus, OH.

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FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602122N
PROGRAM ELEMENT TITLE: AIRCRAFT TECHNOLOGY
PROJECT NUMBER: N.A.

BUDGET ACTIVITY: 1
PROJECT TITLE: N.A.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.
2. (U) SCHEDULE CHANGES: Not applicable
3. (U) COST CHANGES: The decrease os 2,528 in FY 1991 is due to Congressional direction to reduce Integrated High Performance Turbine Engine Technology.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

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FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602122N
PROGRAM ELEMENT TITLE: AIRCRAFT TECHNOLOGY
PROJECT NUMBER: N.A.

BUDGET ACTIVITY: 1
PROJECT TITLE: N.A.

G. (U) RELATED ACTIVITIES: PE 0602234N, Systems Support; PE 0602102F, Materials; PE 0602131N, Marine Corps Landing Force Technology; PE 0603210N, Advanced Aircraft Propulsion Systems; PE 0603217N, Advanced Aircraft Subsystems; PE 0602270N, Electronic Warfare Technology; PE 0602201F, Aerospace Flight Dynamics; PE 0602203F, Aerospace Propulsion, PE 0602211/47A, Aeronautical Technology.

H. (U) OTHER APPROPRIATION FUNDS: None.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

J. (U) MILESTONE SCHEDULE: Not applicable.

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FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602131M BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: MARINE CORPS LANDING FORCE TECHNOLOGY
PROJECT NUMBER: N.A. PROJECT TITLE: N.A.

A. (U) RESOURCES: (Dollars in Thousands)

TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMP.	TOTAL PROGRAM
Marine Corps Landing Force Technology	20,338	16,791	18,036	19,026	Cont.	Cont.

B. (U) DESCRIPTION: This is the only DoD 6.2 program that develops technologies needed to support unique USMC expeditionary forces' warfighting requirements. Mission needs are derived from specific threat capabilities and the requirement to operate in tactical scenarios worldwide, conducting amphibious, contingency and Special Operations in Low Intensity Conflict (LIC). Specific requirements documents are the Marine Air Ground Task Force Master Plan, the Marine Corps Long Range Plan, the Marine Corps Campaign Plan, and the Marine Corps POM-90 Needs input to the Navy Needs Statement. This P.E. contains multiple projects in various disciplines. All are continuous as projects but vary internally to address emerging requirements with evolving technology.

(U) This element supports the following DOD Critical Technologies: Simulation and Modeling, Passive Sensors, Signal Processing, Signature Control, Data Fusion, High-Energy Density Materials, Composite Materials, and Biotechnology.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) SURFACE MOBILITY TECHNOLOGY

1. (U) FY 1990 Accomplishments: Completed testing of High Water Speed Technology Demonstrator (HWSTD), fabricated Propulsion Systems Demonstrator (PSD), completed electric Drive M-113 vehicle. Verified the drive train computer control.

2. (U) FY 1991 Program: Complete Government testing of PSD and transition to PE 0603611M. Complete documentation of Lightweight armor concepts. Evaluate unique vehicle concepts for feasibility.

3. (U) FY 1992 Plans: Complete testing of advanced Band Track; Vehicle land mobility improvements; unique water piston propulsion systems development.

4. (U) FY 1993 Plans: Transition Technology for Advanced Propulsion and Water Piston Propulsor (WPP) Technology to advanced technology demonstration (ATD) under PE 0603640M.

5. (U) Program to Completion: Continuing Program.

(U) CHEMICAL/BIOLOGICAL DEFENSE TECHNOLOGY

1. (U) FY 1990 Accomplishments: Completed testing of aerial detector. Evaluated decon additives, protective clothing/rainwear materials, new sorbent decon technology, pilot plant Waterproof Breathable Reactive Sorptive (WARS) materials. Developed diagnostic kit technology. Initiated filtration systems concept assault mask. Transitioned voicemitter/quick-doff hood to PE 0603635M.

2. (U) FY 1991 Program: Continue 1990 program. Evaluate decon dispensers/WARS materials/new elastomers/flocked systems. Transition: WARS to ATD (PE 0603640M); VX conversion to industry; Algorithm and interferometer technology to Aerial Stand Off Detector ATD, (PE 0603640M).

3. (U) FY 1992 Plans: Initiate enzymatic decon effort. Continue filtration efforts. Evaluate onboard detection/hybrid filtration/decon concepts for vehicles. Transition: reactive and flocked materials to ATD, PE 0603640M; protective boot elastomers/assault mask to (PE 0603640M); FLIR

detectors to the U.S. Army Night Vision Laboratory (USA NVL).

4. (U) FY 1993 Plans: Continue technologies for vehicles. Transition sorbent/foam decon material/dispensers/filtration technology, and filter canisters to ATD (PE 0603640M).

5. (U) Program to Completion: Continuing program.

(U) MINE DETECTION AND MINE COUNTERMEASURES TECHNOLOGY

1. (U) FY 1990 Accomplishments: Completed threat assessment and characterization of distributed explosive techniques/acoustic measurements. Transitioned Airborne Mine Detection/Surveillance System (AMDAS) to ATD (PE 0603640M). Conducted multi-spectral mine detection signature (MSSD) tests; joint MDAS/Standoff Mine Detection Ground (SMDG) flight and ground tests with Army Remote Minefield Detection System (REMIDS) and Airborne Mine Detection and Reconnaissance System (AMIDARS) systems.

2. (U) FY 1991 Program: Optimize Distributed Explosive deployment method. Initiate sensor/decoy integration and fabrication of testbed/MSSD optical system design for Magneto-Hydrodynamic (MHD) devices and delivery for Stand-off Mine Detection.

3. (U) FY 1992 Plans: Complete underwater explosive array testing and transition to the fleet. Complete fabrication/integration of sensor/decoy/testbed for Wide Area Mine Clearance (WAMC) and conduct demo. Initiate integration/fabrication of MSSD subsystems and MHD devices and delivery systems.

4. (U) FY 1993 Plans: Test prototype model distributed explosives array. Evaluate MSSD and MHD fabrication efforts. Transition to Stand-Off Mine Detection, Ground ATD (PE 0603640M).

5. (U) Program to Completion: Continuing Program.

(U) BATTLEFIELD ELECTRONIC SUPPORT TECHNOLOGY

1. (U) FY 1990 Accomplishments: Demonstrated USMC Command Information Processor (CIP) for the C2 2000 concepts study. Tested tactical deception devices. Demonstrated forward observer device. Began software interfaces for C2 2000 concepts study.

2. (U) FY 1991 Program: Two-station demonstration of CIP. Begin development of improved interrogation devices. Transition to Amphibious Assault Networking ATD (PE 0603640M).

3. (U) FY 1992 Plans: Assemble/demo third CIP; expand application software. Transition Interrogation technology to C2 2000 ATD (PE 063640M. Continue investigation of comms concepts.

4. (U) FY 1993 Plans: Expand software capabilities of CIP; interface with USN Task Force Command/Control System.

5. (U) Program to completion: Continuing program.

(U) ADVANCED AMPHIBIOUS LOGISTICS TECHNOLOGY

1. (U) FY 1990 Accomplishments: Completed: designs on High Speed Controls/Automated Load Acquisition; D7G protection kit.

2. (U) FY 1991 Program: Initiate concept exploration baseline for future Amphibious Logistics Concepts.

3. (U) FY 1992 Plans: Complete concept exploration.

4. (U) FY 1993 Plans: Initiate feasibility investigations of logistic concepts to support Over-the-Horizon operations.

5. (U) Program to Completion: Continuing program.

(U) WEAPONRY TECHNOLOGY

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FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602131M BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: MARINE CORPS LANDING FORCE TECHNOLOGY
PROJECT NUMBER: N.A. PROJECT TITLE: N.A.

1. (U) FY 1990 Accomplishments: Completed: experiments against energetic targets; assessment of lightweight 155mm howitzer. Demonstrated: concept for Light Armored Vehicle-Air Defense passive sensing; advances in polymer technology.

2. (U) FY 1991 Program: Begin three new initiatives. Integrate passive sensors/quiet radar technology. Transition Armor Piercing Tubular Sabot (APTS) to ATD. Initiate Advanced Lightweight Ground Weaponry (ALGW) and Special Purpose Weaponry (SPW) efforts in support of SOLIC.

3. (U) FY 1992 Plans: Demo improved armor penetration with initial capability of man-in-loop Automated Target Detection and Identification System (ATDIS) and autonomous sensing aided by neural network. Continue sensor integration and data fusion. Initiate Vertical Assault Support (VAS) operational concepts.

4. (U) FY 1993 Plans: Demonstrate ATDIS/transition to ALGW ATD. Integrate Advanced Helicopter Gun System (AHGS) into rotary wing platform and demo Low Probability of Intercept Radar and ECM/Acoustic sensor capability for integrated sensor coverage for short-range air defense.

5. (U) Program to completion: Continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: MCRDAC, Quantico, Va; NOSC, NPRDC San Diego CA; HDL, Adelphi, MD; DTRC, Carderock, MD; NCEL, Port Hueneme, CA; MTL, Watertown, MA; NCSC, Panama City, FL; DOE, Las Vegas, NV/Los Alamos, NM/Idaho Falls, ID; LANL, Los Alamos, NM; NSWC Dahlgren, VA; NWC, China Lake, CA; NRL, Washington DC; CONTRACTORS: SAIC, General Dynamics and Solar Turbines, San Diego, CA; AAI Corp, Hunt Valley, MD; MTU Corporation, Friedrichshafen, FGR; EASI, St. Louis, MO; Aardvark, Aberdeen Scotland; APL/University of Washington, Seattle, WA.

E. (U) COMPARISON WITH FY1991 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.
2. (U) SCHEDULE CHANGES: Not applicable.
3. (U) COST CHANGES: The decrease of 1,341 in FY 1991 is due to Congressional direction to elmininate apparent duplication of effort between AMDAS program and another DON program.

F. (U) PROGRAM DOCUMENTATION: Not Applicable.

G. (U) RELATED ACTIVITIES: PE 0602232N C3 Technology; PE 0603617N Unified Networking Technology; PE 0604577N Communication Support System; USA, USAF, USN Tech Base Programs.

H. (U) OTHER APPROPRIATION FUNDS: None.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

J. (U) MILESTONE SCHEDULE: Not applicable.

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FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602232N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: COMMAND, CONTROL & COMMUNICATIONS (C3)
PROJECT NUMBER: N.A. PROJECT TITLE: N.A.

A. (U) RESOURCES: (Dollars in Thousands)

TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMP.	TOTAL PROGRAM
C3	17,344	18,262	19,617	20,123	Cont.	Cont.

B. (U) DESCRIPTION: This program provides the technologies needed by the primary warfare areas to meet requirements in more survivable C3 systems, secure communications, tactical communications interoperability, timely data fusion, decision aids and accurate navigation. Present emphasis in joint operations requires, as a high priority, Joint Service/NATO tactical C3 systems interoperability. Today, combat decisions must often be made and implemented in seconds, while the amount of information needed by a commander to conduct operations, and the number of threats to his communications links, are rapidly increasing. New long-range weapons require more precise navigation while being more reliable and affordable.

(U) This element supports the following DoD Critical Technology: Data Fusion.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) C3 SYSTEM ARCHITECTURE

1. (U) FY 1990 Accomplishments:

a. (U) Conducted demonstration of battlegroup communications employing networked high-frequency (HF) and ultra-high-frequency (UHF) line-of-sight (LOS) links.

b. (U) Completed transition of Unified Network Technology to 6.3A Advanced Technology Demonstration.

c. (U) Developed algorithms for dissemination of topology/connectivity information in a battlegroup environment.

2. (U) FY 1991 Program:

a. (U) Complete development and simulation analysis of improved network routing algorithms to shorten net cycle time, and reduce message delays and overhead.

b. (U) Investigate low-data-rate voice techniques and associated protocols in packet-switched UHF/LOS tactical networks for point-to-point and conference-mode communications.

c. (U) Develop a new reliable datagram protocol for connectionless service by enhancing the DoD standard User Datagram Protocol (UDP) with new error-control algorithm.

3. (U) FY 1992 Plans:

a. (U) Implement and test the reliable protocol.

b. (U) Demonstrate employment of compressed headers on the DoD Standard Internet Protocol (IP).

c. (U) Conduct interoperability studies between future military and civilian telecommunication networks.

4. (U) FY 1993 Plans: Demonstrate internet architecture and algorithms.

5. (U) Program to Completion: This is a continuing program.

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FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602232N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: COMMAND, CONTROL & COMMUNICATIONS (C3)
PROJECT NUMBER: N.A. PROJECT TITLE: N.A.

(U) COMMUNICATIONS

1. (U) FY 1990 Accomplishments:

a. (U) Developed and transitioned wideband amplifier for the submarine buoyant-cable antenna to the Submarine Integrated Antenna System (SIAS) Program.

b. (U) Conducted joint arctic experiment with the Air Force to investigate meteor-burst antenna performance.

c. (U) Completed investigations into the effects of partial correlation, jamming and fading on the performance of the Low-Probability-of-Intercept (LPI) spread spectrum waveform.

d. (U) A Memorandum of Agreement with the Air Force has been signed to develop LPI airborne communications.

2. (U) FY 1991 Program:

a. (U) Conduct at-sea demonstration of an extremely low frequency (ELF) on-hull antenna for submarines.

b. (U) Conduct experiments of two-way relay buoy.

c. (U) Investigate new wideband communications modes, such as atmospheric evaporation ducts and troposcatter.

d. (U) Demonstrate the signal time-out protocol implemented on an HF adaptive antenna array.

e. (U) Develop jointly with Air Force a covert airborne communication system employing LPI spread-spectrum waveform.

3. (U) FY 1992 Plans:

a. (U) Initiate experiments of two-way relay buoy.

b. (U) Investigate wideband communication modes.

c. (U) Complete the signal time-out protocol development

4. (U) FY 1993 Plans: Investigate radar for communications purposes.

5. (U) Program to Completion: This is a continuing program.

(U) NAVIGATION

1. (U) FY 1990 Accomplishments:

a. (U) Completed and transitioned the miniature ring-laser gyro technology to the Advanced Technology Demonstration Ring-Laser Gyro Program.

b. (U) Completed test and evaluation of high-accuracy ring-laser gyros for submarines.

c. (U) Completed lab tests of Attitude and Heading Reference System (AHARS) fiber-optic gyro.

d. (U) Completed at-sea feasibility demonstration of the passive geomagnetic navigation system.

2. (U) FY 1991 Program:

a. (U) Build and test closed-loop fiber-optic gyro.

b. (U) Conduct phase 2 tests of the geomagnetic navigation system in northern latitude region.

c. (U) Identify technology issues associated with improving battleforce navigation.

3. (U) FY 1992 Plans:

a. (U) Complete tests on closed-loop fiber-optic gyro.

b. (U) Complete and transition geomagnetic navigation.

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FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602232N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: COMMAND, CONTROL & COMMUNICATIONS (C3)
PROJECT NUMBER: N.A. PROJECT TITLE: N.A.

c. (U) Conduct experiments for improving battlegroup navigation/operations.

4. (U) FY 1993 Plans: Test improved AHARS-grade fiber-optic gyro.

5. (U) Program to Completion: This is a continuing program.

(U) COMMAND SUPPORT

1. (U) FY 1990 Accomplishments: Installed Advanced Real-Time Distributed Operating System (ARTS) into lab testbed.

2. (U) FY 1991 Program: Demonstrate ARTS on real-time local networks.

3. (U) FY 1992 Plans: Develop real-time network interface units.

4. (U) FY 1993 Plans: Develop real-time distributed databases.

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NADC, Warminster, PA; NOSC, San Diego, CA; NRL, Washington, D.C.; NUSC, New London, CT; NWC, China Lake, CA. CONTRACTORS: Westinghouse Electric Corporation, Pittsburgh, PA; Litton Industries, Los Angeles, CA; Carnegie Mellon University, Pittsburgh, PA.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: Not applicable.

3. (U) COST CHANGES: Not applicable.

F. (U) PROGRAM DOCUMENTATION: Not Applicable.

G. (U) RELATED ACTIVITIES: PE 0602314N, ASW Technology; PE 0602435N, Ocean and Atmospheric Support Technology.

H. (U) OTHER APPROPRIATION FUNDS: None.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

J. (U) MILESTONE SCHEDULE: Not Applicable.

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FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602233N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: MISSION SUPPORT TECHNOLOGY
PROJECT NUMBER: N.A. PROJECT TITLE: N.A.

A. (U) RESOURCES: (Dollars in Thousands)

TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMP.	TOTAL PROGRAM
Mission Support Technology	30,322	34,236	37,017	37,974	Cont.	Cont.

B. (U) DESCRIPTION: This program provides mission support technologies essential for all naval operations. Personnel and training technologies enhance the Navy's ability to select, assign and train people for highly demanding jobs. Biomedical technologies improve the medical care delivery system and enhance performance capabilities under adverse conditions. Chemical and Biological Defense (CBD) technologies improve the ability to respond to existing and future CBD threats. Logistics technologies increase operational readiness through effective management and movement of supplies ashore and at-sea; improved fuel procurement specifications; and advanced techniques for more cost-effective construction and maintenance of shore and off-shore facilities. Environmental protection technologies will improve Navy-unique capabilities to meet air- and water-quality regulatory standards and to reduce toxic-waste generation.

(U) This element supports the following DOD Critical Technologies: Simulation and Modeling, and Biotechnology.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

a. (U) Completed evaluation of a prototype network for training personnel who are remote from instructional facilities.

b. (U) Developed improved techniques for computer-administered testing to select and assign Naval applicants.

c. (U) Completed development of the Chemiresistor device for detecting CW agent vapors.

d. (U) Determined final formulation and impregnant loading for new reactive sorbent for CW agent filtration.

e. (U) Completed development of the large diameter Tensioned Hose Fueling at Sea System.

f. (U) Completed development of a multi-element formula which will permit maintenance personnel to determine remaining useful life of KAPTON wiring in Naval aircraft.

g. (U) Completed development of design guidance to build Tactical Air Combat Training System ranges in deep ocean areas.

2. (U) FY 1991 Program:

a. (U) Evaluate the effectiveness of providing embedded training capability in a shipboard combat direction system.

b. (U) Begin final development of software to optimize Naval enlisted personnel assignment decisions.

c. (U) Introduce the Fiber Optic-based Bio-sensor for experimental use in Operation Desert Storm.

d. (U) Introduce directly into the Fleet the completed Proximity/Structural Firefighter's Glove.

e. (U) Begin Navy large-scale filter tests of new reactive sorbent for CW agent filtration.

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f. (U) Survey and select alternate materials to overcome the problem of wind-driven aerosol penetration of Navy chemical protective overgarments.

g. (U) Complete design guidance for construction of a High Performance Magazine system and transition to an Advanced Technology Demonstration (ATD) in PE 0603792N.

h. (U) Complete development of methods to shield power lines from the effects of high-altitude electromagnetic pulses.

i. (U) Establish baseline requirements for a bearing and gear analyzer for Naval helicopter maintenance.

j. (U) Complete development of methods to enable Navy Inventory Control Points to determine environmental stress screening requirements for reprocurement of electronic spares.

k. (U) Complete development of a plastic film substitute which can be fabricated into trash bags for use at sea.

3. (U) FY 1992 Plans:

a. (U) Begin evaluation of training strategies, decision-support concepts and displays for improving individual and team tactical decision-making under stress.

b. (U) Begin development of simulation technology for deployable, low-cost training systems to maintain/enhance operator skills.

c. (U) Complete evaluation of techniques to improve individual and unit productivity in the Navy civilian workforce.

d. (U) Complete and transition all work on adult respiratory distress syndrome.

e. (U) Complete evaluation of intermittent cooling systems for use aboard ship in hot spaces too confined for continuous use of microclimate cooling systems.

f. (U) Complete the enzymatic removal of Rh antigen from the surface of the red blood cells.

g. (U) Complete development of the airlock vapor removal concept or aerosol scrubber.

h. (U) Complete design criteria for new synthetic lines and terminations suitable for use in deep-water moorings.

i. (U) Complete new design approaches for less expensive construction and maintenance of Navy undersea ranges.

4. (U) FY 1993 Plans:

a. (U) Complete development and evaluation of advanced concepts for graphics displays to improve maintenance training and job-aiding.

b. (U) Complete evaluation of advanced video and computer-graphic applications to Navy instruction.

c. (U) Complete development of methods for estimating the optimal allocation of recruiting resources.

d. (U) Complete development of the silicon-based sensor electrode for detection of a wide range of toxins.

e. (U) Complete and transition all technologies developed under the cold-weather adaptation program.

f. (U) Begin exploratory development of advanced material handling systems for submarines.

5. (U) Program to Completion: This is a continuing program.

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FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602233N
PROGRAM ELEMENT TITLE: MISSION SUPPORT TECHNOLOGY
PROJECT NUMBER: N.A.

BUDGET ACTIVITY: 1
PROJECT TITLE: N.A.

D. (U) WORK PERFORMED BY: IN-HOUSE: Naval Air Propulsion Center, Trenton, NJ; NCSC, Panama City, FL; NTSC, Orlando, FL; NPRDC, San Diego, CA; Naval Medical Research Institute, Bethesda, MD; NADC, Warminster, PA; DTRC, Bethesda, MD; NCEL, Port Hueneme, CA; NSWC, Dahlgren, VA; NRL, Washington, DC, NOSC, San Diego, CA. CONTRACTORS: Smithsonian Institution, Washington, DC; National Institute of Standards and Technology, Gaithersburg, MD; Boston Univ., Boston, MA; New York Blood Center, New York, NY; Carnegie-Mellon U., Pittsburgh, PA.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
1. (U) TECHNOLOGY CHANGES: Not applicable.
2. (U) SCHEDULE CHANGES: Not applicable.
3. (U) COST CHANGES: Not applicable.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: PE 0602314N, ASW Technology; PE 0602122N, Aircraft Technology; PE 0602111N, AAW/ASUW Technology; PE 0602232N, Command, Control and Communications Technology, PE 0602131M, Marine Corps Landing Force Technology. Coordination mechanisms with the other services include the Armed Services Biomedical Research Evaluation and Management (ASBREM) committee for Biomedical programs, and the Joint Chemical Effects Data Research Guide (JCEDAR) and the Joint Development Objectives Guide (JDOG) for CBD programs.

H. (U) OTHER APPROPRIATION FUNDS: None.
I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.
J. (U) MILESTONE SCHEDULE: Not applicable.

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FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602234N
BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: SYSTEMS SUPPORT TECHNOLOGY
PROJECT NUMBER: N.A.
PROJECT TITLE: N.A.

A. (U) RESOURCES: (Dollars in Thousands)

TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMP.	TOTAL PROGRAM
System Support Technology	65,179	71,131	80,521	82,603	Cont.	Cont.

B. (U) DESCRIPTION. This is a broad technology base program to provide the Navy with the capability, resources, and expertise to implement advanced weapon and platform system concepts. Materials and electronic devices are enabling technologies addressing fundamental systems limitations in performance, reliability and cost. Computer technology includes hardware, software, machine intelligence, and software/systems engineering. The Human Factors topic addresses high-payoff technological opportunities in man/machine interfaces, decision-making and information transfer.

(U) This element supports the following DoD Critical Technologies: Microelectronics, Software Producibility, Parallel Computer Architectures, Machine Intelligence and Robotics, Photonics, Sensitive Radars, Passive Sensors, Signal Processing, Composite Materials, Superconductivity, and Biotechnology.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

a. (U) Demonstrated that metal matrix composite thermal planes provide a three-fold increase in thermal conductivity at one-third the density of baseline materials.

b. (U) Burner rig testing of hybrid glass-ceramic composites for the integrated high performance turbine engine technology (IHPTET) engine application completed successfully.

c. (U) Demonstrated a low-cost 250W (CW) 44 GHz Travelling Wave Tube (TWT) for the Navy MILSTAR Terminal (NESP).

d. (U) Delivered a 14-bit, 25-Megasamples/sec (MS/sec) Analog/Digital (A/D) converter to NADC for use in development of next-generation ASW receiver.

e. (U) Developed prototype displays of acoustic/oceanographic data produced by software operating on a massively parallel high-performance computer.

f. (U) Completed development of supervisory control techniques for underwater vehicles and manipulators, with application to the ARGO-JASON deep-ocean research system.

g. (U) Completed development of a prototype decision aid to assist the submarine Approach Officer in developing an accurate understanding of the current 3-D ASW tactical situation.

h. (U) Developed Computer-Aided Design tools for simulating low-power/low-weight digital signal processors.

2. (U) FY 1991 Program:

a. (U) Integrate sensing and control systems into "OSPREY" metal spray-forming unit to fabricate complex shapes.

b. (U) Initiate development of advanced high-temperature bearing materials for turbine-engine applications.

c. (U) Demonstrate thermal plane efficiency of high-thermal-

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conductivity composites in electronic packaging.

d. (U) Initiate robust processing technology program for ceramic and metal matrix composites.

e. (U) Demonstrate complementary heterojunction bipolar transistors at 35 GHz with 5 dB gain, 50 mw output, and 30% power-added efficiency.

f. (U) Demonstrate a 128 x 64 vector-matrix multiplier.

g. (U) Characterize Thulium/Holmium for energy transfer and upconversion.

h. (U) Design a multi-chip Artificial Neural Network for motion detection in high-noise environments.

i. (U) Develop a software emulation of low-power/low-weight digital signal processors.

j. (U) Start evaluation of commercial Computer-Aided Design/Engineering (CAD/CAE) tools for large-scale, complex Navy Systems.

k. (U) Begin evaluation of display techniques for review of large volumes of undersea surveillance data.

l. (U) Begin evaluation of design guidance for standardized man-machine interfaces for command and control systems.

3. (U) FY 1992 Plans:

a. (U) Continue development of high-temperature bearing materials for turbine-engine applications.

b. (U) Transition high-thermal-conductivity composites technology to the SHARP program for use in the standard electronic module-E size (SEM-E) module.

c. (U) Demonstrate process technology and material reproducibility for ceramic and metal matrix composites.

d. (U) Start major (8,000) new Tri-Service initiative on Microwave Power Tubes, under Navy lead, per OSD direction.

e. (U) Demonstrate a 100 x 100 neural network, self-learning array.

f. (U) Demonstrate acousto-optic (A-O) and magnetostatic wave (MSW) channelized receiver for EW applications.

g. (U) Demonstrate transistors fabricated in silicon-on-insulator with a buried-conductor technology which is extendable to 3D Integrated Circuits.

h. (U) Complete a demonstration version of low-power/low-weight digital signal processor.

i. (U) Develop a solid state laser diode array pump that is temperature insensitive over the military environment.

j. (U) Develop prototype designs for CAD/CAE tools for large-scale, complex Navy systems.

k. (U) Complete evaluation of neurophysiological techniques to predict operator decrement due to fatigue and workload.

l. (U) Begin development of guidelines for adaptive function allocation between pilots and intelligent automated systems.

4. (U) FY 1993 Plans:

a. (U) Complete development of thin, lightweight carbon-carbon spacecraft truss structure.

b. (U) Select intermetallic materials for performance demonstrations in generation-six IHPTET turbine engine.

c. (U) Demonstrate a free-standing diamond sensor window for tactical missiles.

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FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602234N
PROGRAM ELEMENT TITLE: SYSTEMS SUPPORT TECHNOLOGY
PROJECT NUMBER: N.A.
BUDGET ACTIVITY: 1
PROJECT TITLE: N.A.

d. (U) Demonstrate a 16-bit, 125-Megasample/sec (MS/sec) A/D converter in a dual-chip, single-package configuration.

e. (U) Continue Navy-lead Tri-Service initiatives on Microwave Power Tubes.

f. (U) Demonstrate a 300 W peak (10 W average) impact, avalanche, transit-time (IMPATT) power source at W band.

g. (U) Demonstrate performance model of notional large-scale Navy airborne systems.

h. (U) Demonstrate the design through simulation software for Navy airborne systems.

i. (U) Complete development of operator interface design guidelines to improve the display of multiple-source sensor data.

j. (U) Complete the development of advanced auditory and visual display concepts to improve passive sonar analysis.

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NCEL, Port Hueneme, CA; DTRC, Bethesda, MD; NADC, Warminster, PA; NOSC, San Diego, CA; NRL, Washington, D.C.; NSWC, Dahlgren, VA; NWC, China Lake, CA; NAC, Indianapolis, IN; NUSC, New London; CT. CONTRACTORS: ALCOA, Alcoa Center, PA; FMI, Biddeford, Maine; MDAC, St. Louis, MO; Hughes Aircraft, Torrance, CA; Raytheon, Waltham, MA; LMSC, Sunnyvale, CA; ROI, Torrance, CA; SPARTA, Inc., LaJolla, CA; TI, Dallas, TX.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not Applicable.
2. (U) SCHEDULE CHANGES: Not Applicable.
3. (U) COST CHANGES: In FY 1991 an increase of 2,500 is due to Congressional direction to support a robust process technology initiative in metal matrix and ceramic matrix composite materials.

F. (U) PROGRAM DOCUMENTATION: Not Applicable.

G. (U) RELATED ACTIVITIES: PE0602111N, AAW/ASUW Technology; PE0602270N, Electronic Warfare Technology; PE0602121N, Surface Ship Technology; PE0602122N, Aircraft Technology; PE0602323N, Submarine Technology; PE0602232N, Command, Control and Communications Technology; and PE0602324N, ASW Technology. Non-Navy/joint relationships include IHPTET, JDL, NMAB, DARPA, NASP, Tri-Service Laser Hardening Group, DoD Advisory Group on Electronic Devices and DoD Software Working Group.

H. (U) OTHER APPROPRIATION FUNDS: None.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

J. (U) MILESTONE SCHEDULE: Not Applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602270N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: ELECTRONIC WARFARE TECHNOLOGY
PROJECT NUMBER: N.A. PROJECT TITLE: N.A.

A. (U) RESOURCES: (Dollars in Thousands)

TITLE	FY 1990 ACTUAL*	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMP.	TOTAL PROGRAM
Electronic Warfare Technology	------	12,818	13,975	14,336	Cont.	Cont.

* Funded under Program Element 0603270N in FY 1990.

B. ( ) DESCRIPTION: This program addresses the required technologies of Electronic Warfare (EW) cooperatively with the other Services and uniquely addresses war-at-sea EW technologies. Traditionally, EW threats have resided in the lower microwave frequencies, the Electro-Optic (EO) and Infrared (IR) regions, and were countered by Electronic Countermeasures (ECM), almost exclusively, during the terminal phase of an engagement. Validated, projected, or mirrored threats have required investigations into the The advent of Low Observables (LO) technology has also caused the Navy, with the other Services,

This program now investigates new technologies for Countermeasures (CM) (on-board and off-board devices); jammers and false-target generators; signal detection and deception; and the related signal processors required. This program also encompasses

expendables to defeat dual-mode, RF and IR, anti-ship and anti-aircraft missiles. Other technological investigations include CMs for our

The program has been restructured in accordance with the DoD Electronic Warfare Master Plan, to provide for better Tri-Service coordination and more opportunities for joint-Service development.

(U) This element supports the following DOD Critical Technologies: Microelectronics, Parallel Computer Architectures, Simulation and Modeling, Passive Sensors, Signal Processing, Signature Control, and Data Fusion.

C. ( ) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. ( ) FY 1990 Accomplishments:

a. (U) Demonstrated false-target discrimination for Electronic Support Measures (ESM) receivers.

b. (U) Completed Millimeterwave Monolithic Integrated Circuit (MMIC) superheterodyne receiver design.

c. (U) Completed fleet demonstration and evaluation of Electronic Warfare Control Module (EWCM) prototype.

d. ( ) Demonstrated technology against radars.

e. (U) Transitioned Holmium YAG laser to IRCM BTI program.

f. (U) Evaluated Straight Through Repeater Antenna Performance (STRAP) decoy.

g. (U) Developed and tested a short-wavelength fiber- optic-coupled laser warning receiver with quadrant resolution.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602270N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: ELECTRONIC WARFARE TECHNOLOGY
PROJECT NUMBER: N.A. PROJECT TITLE: N.A.

h. ( ) Completed testing of candidate Torch enhancement.
i. (U) Completed Lamp Augmented IR (LAIR) countermeasure.

2. ( ) FY 1991 Program:
a. (U) Develop IR Laser source for shipboard IRCM ATD transition in FY 1992
b. ( ) Advanced Decoys: Evaluate
c. ( ) Jammer: Integrate prototype high-voltage power supply to Travelling Wave Tube (TWT) and demonstrate full- power operation.
d. (U) STRAP Decoy: Demonstrate STRAP expendable decoy and transition to Tri-Service joint full-scale development.
e. ( ) Procure chaff for Radar Cross Section (RCS) measurements and evaluation.
f. (U) Complete Limited Probability of Intercept (LPI) ESM characterizer breadboard for field tests.
g. ( ) Initiate upgrade to STRAP expendable decoy.

3. ( ) FY 1992 Plans:
a. ( ) Complete test and evaluation.
b. ( ) Integrate into fleet radar.
c. (U) Demonstrate expert automated signal sorting processor.
d. ( ) Transition ECM into advanced technology development.
e. (U) Field test thin ring chaff.
f. ( ) Complete evaluation of chaff.

4. ( ) FY 1993 Plans:
a. (U) Integrate expert processor system into an ESM system for Fleet demonstration.
b. (U) Complete development and evaluation of shipborne MMW receiver/jammer prototype.
c. (U) Test Pulse-on-noise decoy system.
d. (U) Integrate noise jammer module with advanced signal countermeasures decoy.
e. ( ) Demonstrate robust ECM system for countering techniques.
f. ( ) Demonstrate

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: Naval Research Laboratory, Washington, DC; Naval Air Development Center, Warminster, PA; Naval Weapons Center, China Lake, CA; Naval Surface Warfare Center, White Oak, MD; Naval Weapons Systems Center, Crane, IN. CONTRACTORS: Raytheon Corporation, Goleta, CA; Tracor, Inc., Austin, TX; Johns Hopkins University Applied Physics Laboratory, Silver Spring, MD; Westinghouse, Baltimore, MD, and Pittsburgh, PA; Hewlett Packard, CA; Watkins Johnson, CA; Harris Corp, FL; and Tektronics, CA.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
1. (U) TECHNOLOGY CHANGES: Not applicable.
2. (U) SCHEDULE CHANGE: Not applicable.
3. (U) COST CHANGES: Not applicable.

F. (U) PROGRAM DOCUMENTATION: Not Applicable.

G. (U) RELATED ACTIVITIES: This Program Element is closely associated with Program Element 0602111N (Anti-Air Warfare/Anti-Surface Warfare Technology); Program Element 0602315N, (Mine and Special Warfare Technology); Program Element 0602234N, (Systems Support Technology); Program Element 0602232N, (Command and Control Technology); Program Element 0603270N, (Electronic Warfare Advanced Technology). This element and the AF/Army programs in PE 0603270F and 0603270A are coordinated by the Joint Directors of Laboratories Technology Panel for Electronic Warfare through Service MOUs.

H. (U) OTHER APPROPRIATION FUNDS: None.
I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.
J. (U) MILESTONE SCHEDULE: Not applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602314N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: ANTI-SUBMARINE WARFARE TECHNOLOGY
PROJECT NUMBER: N.A. PROJECT TITLE: N.A.

A. (U) RESOURCES: (Dollars in Thousands)

TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMP.	TOTAL PROGRAM
ASW Technology	124,928	124,098	130,902	134,276	Cont.	Cont.

B. (U) DESCRIPTION: This element develops technologies for detection, tracking, localization, classification, destruction and/or neutralization of undersea targets.

( ) The Soviets have made a concerted effort to reduce the effectiveness of U.S. ASW weapons and sensors. This has resulted in submarines which are deeper diving, faster, and quieter;

The proliferation of quiet, modern, diesel-electric submarines in third world countries exacerbates the problem, ; In response. U.S. Forces need surveillance systems, and underwater weapons with improved warheads and guidance and control systems.

( ) New sensor systems will rely on sonars. Systems will exploit signals and improved algorithms. Sensors must be developed for fixed surveillance systems and for systems deployed from air, submarine and surface platforms. To provide needed advanced technology, improved propulsion systems and torpedo hydrodynamics are being developed. Weapon lethality efforts include high-energy explosives and novel warheads. Guidance and control developments emphasize

Countermeasures work includes Combat Control efforts include operator decision aids and target contact management.

(U) This element supports the following DoD Critical Technologies: Parallel Computer Architectures, Robotics, Simulation and Modeling, Photonics, Passive Sensors, Signal Processing, Weapon System Environment, Data Fusion, Computational Fluid Dynamics, High-Energy Density Materials, and Superconductivity.

C. ( ) PROGRAM ACCOMPLISHMENTS AND PLANS:

( ) SURVEILLANCE:

1. ( ) FY 1990 Accomplishments:
   a. ( ) Demonstrated gain in lake.
   b. ( ) Achieved in sonobuoy, Projector.
   c. (U) Successfully compared high performance, reduced-diameter, fiber-optic acoustic sensor with conventional sensor in at-sea test.
   d. ( ) Demonstrated , data.
   e. ( ) Evaluated surveillance system.
2. ( ) FY 1991 Program:

PROGRAM ELEMENT: 0602314N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: ANTI-SUBMARINE WARFARE TECHNOLOGY
PROJECT NUMBER: N.A. PROJECT TITLE: N.A.

a. ( ) Conduc test.
b. ( ) Complete Projector development.
c. ( ) Conduct Experiment (High Gain Array) in the Atlantic
d. ( ) Conduct sea-test of acoustic array.
e. (U) Sea test thin, optical towed-array sensors.
f. ( ) Demonstrate classification capability using from analysis and small-scale modeling.
g. ( ) Demonstrate processing
h. ( ) Complete detection analysis for sensors and apply to system design.
i. ( ) Evaluate projector.

3. ( ) FY 1992 Plans:
a. ( ) Complete analysis of Array Experiment (High Gain Array).
b. ( ) Conduct sea test of towed array.
c. ( ) Conduct test of sonar sensor.
d. ( ) Test array of projectors.
e. ( ) Demonstrate processing for passive system.
f. ( ) Conduct test of data fusion algorithms
g. ( ) Demonstrate surveillance system.
h. ( ) Demonstrate improved active classification
i. ( ) Conduct noise reduction and characterization test.

4. ( ) FY 1993 Plans:
a. ( ) Demonstrate detector.
b. ( ) Conduct sea test of array.
c. ( ) Complete development of an sonobuoy.
d. ( ) Demonstrate signal detection
e. ( ) Develop and test projector.
f. ( ) Transition classification algorithms
g. ( ) Conduct Array Experiment (High Gain Array) in the Atlantic

5. (U) Program to Completion: This is a continuing program.

( ) TORPEDOES AND WARHEADS:

1. ( ) FY 1990 Accomplishments:
a. ( ) Demonstrated combustor at pilot scale for advanced torpedo propulsion.
b. ( ) Characterized technology.
c. ( ) Demonstrated homing
d. (U) Developed signal-loss advisor for combat control.
e. ( ) Completed phase II warhead testing
f. ( ) Evaluated new explosive for upgrading existing and new warheads.

2. ( ) FY 1991 Program:
a. ( ) Transition algorithm.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602314N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: ANTI-SUBMARINE WARFARE TECHNOLOGY
PROJECT NUMBER: N.A. PROJECT TITLE: N.A.

b. (U) Demonstrate surface ship Battle Group Combat Control models and simulations.
c. ( ) Demonstrate battery for torpedo propulsion.
d. ( ) Begin system tests of combustor and turbine.
e. ( ) Test hydrogen and oxygen generators for
f. ( ) Complete laboratory tests of propulsion components

3. ( ) FY 1992 Plans:
a. (U) Demonstrate maneuver decision aid for combat control engagement planning.
b. ( ) Complete evaluation of
c. ( ) Test battery in laboratory.
d. ( ) Test propulsion, warhead, fuze, and guidance technologies
e. ( ) Demonstrate
f. ( ) Conduct in-water runs to test guidance laws.
g. ( ) Transition warhead technology.
h. ( ) Transition for fuzing algorithms.
i. ( ) Demonstrate explosive technology.

4. ( ) FY 1993 Plans:
a. ( ) Integrate propulsion with large diameter half-length vehicle and conduct in-water demonstrations.
b. ( ) Integrate an electric system with a vehicle and demonstrate in-water.
c. ( ) Demonstrate controller.
d. (U) Initiate evaluation of next generation high-lethality undersea warhead concepts.

5. (U) Program to completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE - NSWC, Silver Spring, MD; DTRC, Bethesda, MD; NADC, Warminster, PA; NCSC, Panama City, FL; NOARL, Stennis Space Center, MS; NOSC, San Diego, CA; NUSC, Newport, RI and New London, CT; NUWES, Keyport, WA, NRL, Washington, DC. CONTRACTORS - BBN, Cambridge, MA; General Electric, Syracuse, NY; ARL/PSU, State College, PA; SIO, Univ of Cal, LaJolla, CA; ARL/UT, Austin, TX; APL/UW, Seattle, WA; JHU/APL Laurel, MD; SAIC, McLean, VA; AT&T, Whippany, NJ; Texas Instruments, Dallas, TX.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not Applicable.

2. (U) SCHEDULE CHANGES: Not Applicable.

3. (U) COST CHANGES: An increase of 10,323 by Congress in FY 1991 will continue the expanded and accelerated effort in non-acoustic ASW technologies, High Gain Initiative, Advanced Torpedo Technology Thrust, and Full Spectrum Signal Processing, initially funded as part of FY 1989 and FY 1990 Congressional initiatives to accelerate and expand ASW development programs.

F. (U) PROGRAM DOCUMENTATION: Not Applicable.

G. (U) RELATED ACTIVITIES: PE 0602435N, Ocean and Atmospheric Support Technology; PE 0101224N, SSBN Security Program.

H. (U) OTHER APPROPRIATION FUNDS: None.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None

J. (U) MILESTONE SCHEDULE: Not Applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602315N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: MINE AND SPECIAL WARFARE TECHNOLOGY
PROJECT NUMBER: N.A. PROJECT TITLE: N.A.

A. (U) RESOURCES: (Dollars in Thousands)

TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMP.	TOTAL PROGRAM
Mines/Special Warfare	15,606	22,784	20,549	21,079	Cont.	Cont.

B. (U) DESCRIPTION: This program element provides new technologies for U.S. naval mines, mine countermeasures (MCM), Special Warfare, and Explosive Ordnance Disposal (EOD) equipment.

(U) This element supports the following DoD Critical Technologies: Robotics, Passive Sensors, Signal Processing, Weapon System Environment, and Superconductivity.

( ) Mine Technology. New technologies must be developed if future mines are to be effective against the increasingly sophisticated Soviet submarine threat, exemplified by the MIKE, SIERRA, AKULA, and TYPHOON.

are characteristics to be countered by the new mines. Submarine threats from the third world are becoming increasingly important, as numerous Soviet KILO, West German "Type 209", and other relatively small, modern submarines are imported by developing countries. New technology is needed to facilitate containment of these smaller submarines in the typically shallow bays, gulfs and coastal areas encountered in regional conflicts. Increased performance cannot be achieved by increased size or quantity alone because of delivery platform constraints. Current technology emphasis is on sensors, mine delivery, and advanced minefield concepts.

( ) Mine Countermeasures Technology.

Emphasis is being placed on the detection and neutralization of

Work is also directed toward improving mine influence sweep capabilities,

( ) Special Warfare Technology. Naval Special Warfare missions are primarily clandestine or covert in character and support naval operations by reconnaissance and clearing of amphibious landing beaches, by underwater attacks against enemy shipping and port installations, by raids against targets in coastal areas, by intelligence collection through reconnaissance and/or capture of personnel, and by counter-terrorism with emphasis on recovery of captured ships and aircraft. The principal Special Warfare goal is to develop technology required to increase the combat range and effectiveness of Special Warfare units.

Also, improvements to mission

support equipment, such as weapons, are urgently needed to increase the probability of mission success. Current focus is on technology

( ) EOD Technology. Technology development for the Explosive Ordnance Disposal needs of all the Armed Forces is provided, including that required to counter and dispose of The effort concentrates on developing technologies required for locating, examining and rendering safe conventional and

C. ( ) PROGRAM ACCOMPLISHMENTS AND PLANS:

( ) MINE WARFARE AND MINE COUNTERMEASURES TECHNOLOGY:

1. ( ) FY 1990 Accomplishments:
   a. (U) Verified expert system minefield planner feasibility.
   b. ( ) Confirmed target detection ranges/capability through field tests.
   c. ( ) Successfully measured against ambient background conditions.
   d. ( ) Validated hydrodynamic models.
   e. (U) Conducted quantitative sea test, with adequate environmental support data, of performance of imaging laser-radar mine detection concept.
2. ( ) FY 1991 Program:
   a. ( ) Evaluate mine sensor.
   b. ( ) Complete fabrication and lab demonstration of
   c. ( ) Test effectiveness of
   d. (U) Characterize very-shallow-water MCM environment.
   e. (U) Develop sidescan sonar-based bottom sediment classifier.
3. ( ) FY 1992 Plans:
   a. ( ) Complete study of options with selection of recommended choice for implementation.
   b. ( ) Evaluate technique for mines.
   c. (U) Demonstrate organically deployable, remotely operated minehunting prototype.
   d. ( ) Sea test and demonstrate system concept.
4. ( ) FY 1993 Plans:
   a. ( ) Confirm design.
   b. ( ) Demonstrate signal-to-noise filter.
   c. ( ) Sea test and evaluate system prototype.
5. (U) Program to Completion: This is a continuing program.

( ) SPECIAL WARFARE/EXPLOSIVE ORDNANCE DISPOSAL

1. ( ) FY 1990 Accomplishments:

PROGRAM ELEMENT: 0602315N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: MINE AND SPECIAL WARFARE TECHNOLOGY
PROJECT NUMBER: N.A. PROJECT TITLE: N.A.

a. (U) Prototyped diver glove with variable thermal properties.
b. ( ) Transitioned
technology for the Advanced SEAL Delivery System.
c. ( ) Demonstrated field-portable,
d. ( ) Demonstrated ,sensor.

2. ( ) FY 1991 Program:
a. ( ) Tank test underwater concept.
b. (U) Develop prototype acoustic detector for shallow-water buried mines.
c. (U) Verify predicted covert obstacle avoidance sonar performance.
d. (U) Evaluate viable recon through smoke/obscurants.
e. ( ) Verify performance of

3. (FY 1992 Plans:
a. (Prototype a
b. ( ) Test performance of
c. ( ) Evaluate
d. ( ) Validate technique.

4. ( ) FY 1993 Plans:
a. ( ) Find ways for
b. (U) Identify diver thermal-protection materials with variable passively actuated thermal conductivity.
c. (U) Develop "booby trap" detection measures for EOD use.

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE - NSWC, Dahlgren, VA; NCSC, Panama City, FL; NEODTC, Indian Head, MD; NRL, Washington, D.C.; DTRC, Bethesda, MD; NOARL, Stennis Space Center, MS; CONTRACTORS - Texas A&M Univ., College Station, TX; Univ. of New Hampshire, Durham, NH; Univ. of Wash/APL, Seattle, WA; Battelle Memorial Institute, Columbus, OH; IBM Corp., Manassas, VA

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
1. (U) TECHNOLOGY CHANGES: Not applicable.
2. (U) SCHEDULE CHANGES: Not applicable.
3. (U) COST CHANGES: An increase of 5,000 in FY 1991, provided through Congressional initiative, will be used for developing advanced mine systems technology focused on shallow water and regional scenarios, shallow water mine countermeasures, and other advanced technologies.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: P.E. No. 0602314N (ASW TECHNOLOGY); P.E. No. 0602435N (OCEAN & ATMOSPHERIC SUPPORT TECHNOLOGY); P.E. No. 0602233N (MISSION SUPPORT); P.E. No. 0602131M (MARINE CORPS LANDING FORCE TECHNOLOGY).

H. (U) OTHER APPROPRIATION FUNDS: None.
I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.
J. (U) MILESTONE SCHEDULE: Not applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602323N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: SUBMARINE TECHNOLOGY
PROJECT NUMBER: N.A. PROJECT TITLE: N.A.

A. (U) RESOURCES: (Dollars in Thousands)

TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMP.	TOTAL PROGRAM
Submarine Technology	13,456	16,580	17,813	18,273	Cont.	Cont.

B. ( ) DESCRIPTION: This program provides new technologies for submarine vehicles which enable significantly improved stealth along with while holding costs at current or reduced levels. These technological developments counter Soviet submarine trends.

Program thrusts are: silencing,
combat survivability,
affordability; and operational performance

(U) This element supports the following DoD Critical Technologies: Signature Control, Computational Fluid Dynamics, and Composite Materials.

C. ( ) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. ( ) FY 1990 Accomplishments:

( ) COVERTNESS/SURVIVABILITY:

a. (U) Initiated advanced pressure-hull concepts.

b. ( ) Discovered the governing sources of acoustic noise

c. ( ) Identified potential launcher concept

d. ( ) Completed hydrophone.

e. ( ) Proved feasibility, which greatly improves maneuverability and control.

f. ( ) Initiated breadboard demonstration on a model submarine.

( ) HULL, MACHINERY, AND ELECTRICAL:

a. ( ) Completed study of as a critical technology issue.

b. ( ) Experimentally evaluated pressure hull,

c. ( ) Completed experimental evaluation

d. (U) Transitioned improved shaft seal to Program Element No. 0603561N, (Submarine (Advanced)).

2. ( ) FY 1991 Program:

( ) COVERTNESS/SURVIVABILITY:

a. ( ) Demonstrate potential propulsor quieting

b. ( ) Fabricate quarter-scale launcher.

PROGRAM ELEMENT: 0602323N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: SUBMARINE TECHNOLOGY
PROJECT NUMBER: N.A. PROJECT TITLE: N.A.

c. ( ) Develop
d. ( ) Develop advanced hull concepts.
e. ( ) Complete vent fan technology.

( ) HULL, MACHINERY, AND ELECTRICAL:
a. (U) Formulate and assess minimum-cost submarine concept.
b. (U) Establish criteria on manufacturing imperfections-effects on pressure-hull strength at depth.
c. (Experimentally evaluate small-scale model
d. (Measure hull models.
e. (U) Develop technique to measure change in stiffness of composite material structures during the course of a fire.
f. ( ) Complete air conditioning concept.
g. ( ) Prepare

3. ( ) FY 1992 PLANS:
( ) COVERTNESS/SURVIVABILITY:
a. ( ) Test model propulsor.
b. ( ) Develop quarter-scale
c. ( ) Determine acoustic benefits
d. (Complete pump technology.

(U) HULL, MACHINERY, AND ELECTRICAL:
a. (U) Test composite internal tanks.
b. (U) Formulate integrated advanced machinery concept.
c. (U) Develop advanced electrical power-control system.
d. (U) Recommend advanced, non-chloro-fluoro-carbon air conditioning system.

4. ( ) FY 1993 Plans:
( ) COVERTNESS/SURVIVABILITY:
a. ( ) Transition propulsor to advanced development program.
b. ( ) Design full-scale
c. ( ) Conduct sonar baffle experiments.
d. ( ) Transition to SSN 21.

( ) HULL, MACHINERY, AND ELECTRICAL:
a. ( ) Transition system to R&D Submarine.
b. ( ) Evaluate advanced pressure hull

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: DTRC, Bethesda, MD; NUSC, Newport, RI and New London, CT; NRL, Washington, DC and Orlando, FL; NSWC, Dahlgren, VA

PROGRAM ELEMENT: 0602323N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: SUBMARINE TECHNOLOGY
PROJECT NUMBER: N.A. PROJECT TITLE: N.A.

and White Oak, MD; CONTRACTORS: McDonnell Douglas, St Louis, MO; Atlantic Research, Springfield, VA; Applied Research Lab, Pennsylvania State University, State College, PA; Applied Research Lab, University of Texas, Austin, TX; University of Washington, Seattle, WA.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
1. (U) TECHNOLOGY CHANGES: Not Applicable.
2. (U) SCHEDULE CHANGES: Not Applicable.
3. (U) COST CHANGES: Not Applicable.

F. (U) PROGRAM DOCUMENTATION: Not Applicable.

G. (U) RELATED ACTIVITIES: PE 0101228N, TRIDENT Program; PE 0602234N, Systems Support Technology; PE 0603561N, Submarine (Advanced); PE 0603569E, Advanced Submarine Technology (DARPA); PE 0603569N, Attack Submarine Development; and PE 0604561N, Submarine (Engineering).

H. (U) OTHER APPROPRIATION FUNDS: None.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

J. (U) MILESTONE SCHEDULE: Not Applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602324N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: NUCLEAR PROPULSION TECHNOLOGY
PROJECT NUMBER: N.A. PROJECT TITLE: N.A.

A. (U) RESOURCES: (Dollars in Thousands)

TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMP.	TOTAL PROGRAM
Nuclear Propulsion Technology	14,036	14,513	15,282	15,876	Cont.	Cont.

B. ( ) DESCRIPTION: Nuclear Propulsion Technology provides the foundation of the Naval Nuclear Propulsion Program's highly integrated research and development effort. Key efforts include developing stronger, lighter, more corrosion-resistant materials needed to and ensure plant resiliency, reliability and safety. These efforts are necessary to maintain U.S. technological and operational superiority.

C. ( ) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. ( ) FY 1990 Accomplishments: Continued reactor materials work to gain improved understanding of material properties, which is a base requirement for design and development of advanced plants. Major efforts included:

a. ( ) Development and qualification of advanced cladding, structural materials, and fabrication processes for application to advanced nuclear propulsion plants.

b. (U) Irradiation, corrosion, mechanical-property testing and metallurgical examination of new and existing materials to verify applicability and survivability under the extreme conditions encountered in a reactor plant, ensure continued plant safety, and support irradiation test facilities.

2. ( ) FY 1991 Program: Continue reactor materials work to better understand material properties. Major efforts include:

a. ( ) Continue development and qualification of advanced cladding, structural materials, and fabrication processes for application to advanced nuclear propulsion plants.

b. ( ) Development, testing, and analysis of reactor and structural materials and verification of design concepts in search of applications for existing and developmental materials.

c. (U) Continue irradiation, corrosion, mechanical-property testing and metallurgical examination of new and existing materials to verify applicability and survivability under the extreme conditions encountered in a reactor plant, ensure continued plant safety, and support irradiation test facilities.

3. ( ) FY 1992 Plans:

a. ( ) Develop and qualify advanced and cladding, Pursue structural materials and fabrication processes, for application to advanced components.

PROGRAM ELEMENT: 0602324N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: NUCLEAR PROPULSION TECHNOLOGY
PROJECT NUMBER: N.A. PROJECT TITLE: N.A.

b. (U) Conduct irradiation, corrosion, mechanical-property testing and metallurgical examination of new and existing materials, like Nickel-base alloys X-750 and 625 and pressure-vessel steels, through stress-corrosion, corrosion-fatigue, brittle fracture, and fracture-toughness tests to ensure continued plant safety; verify applicability and survivability under the extreme conditions encountered in a reactor plant, and support irradiation test facilities.

c. ( ) Develop, test, and analyze reactor and structural materials and verify design concepts in search of applications, for existing and developmental materials.

4. ( ) FY 1993 Plans: Continue work on reactor materials. Major efforts will include:

a. ( ) Continue development of specimens, systems cladding, as well as structural materials and fabrication processes, for application to advanced components.

b. (U) Continue testing of new and existing materials, such as Nickel-base alloys X-750 and 625 and pressure-vessel steels, for the effects of irradiation and corrosion on their mechanical properties and metallurgical compositions to ensure continued plant safety and verify applicability and survivability under the extreme conditions encountered in a reactor plant; and support irradiation test facilities.

c. ( ) Continue development, testing, and analysis of reactor and structural materials and verification of design concepts in search of applications for existing and developmental materials.

5. (U) Program to completion: This is a continuing program.

D. (U) WORK PERFORMED BY: Westinghouse Electric Corporation, Bettis Atomic Power Laboratory, and Plant Apparatus Division, Pittsburgh, PA and General Electric Corporation, Knolls Atomic Power Laboratory and Machinery Apparatus Operation, Schenectady, NY.

E. (U) COMPARISON WITH REVISED FY 1991 PRESIDENT'S BUDGET:
1. (U) TECHNICAL CHANGES: Not Applicable.
2. (U) SCHEDULE CHANGE: Not Applicable.
3. (U) COST CHANGES: Not Applicable.

F. (U) PROGRAM DOCUMENTATION: Not Applicable.

G. (U) RELATED ACTIVITIES: This project is related to Program Element 0603570N, Advanced Nuclear Power Systems, and Program Element 0205675N, Operational Reactor Development.

H. (U) OTHER APPROPRIATION FUNDS: None.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

J. (U) MILESTONE SCHEDULE: Not Applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602435N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: OCEAN & ATMOSPHERIC SUPPORT TECHNOLOGY
PROJECT NUMBER: N.A. PROJECT TITLE: N.A.

A. (U) RESOURCES: (Dollars in Thousands)

TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMP.	TOTAL PROGRAM
Ocean and Atmospheric Support Technology	28,834	37,857	39,724	40,750	Cont.	Cont.

B. (U) DESCRIPTION: This element provides exploratory development to support environmental needs for naval weapons and sensor systems in the planning and analysis, design and development, and operational development stages. It develops techniques and prototype equipment to improve the Navy capability to quantitatively measure and predict geophysical parameters on a world-wide basis, and develops the technology required to convert these raw geophysical data into terms of military significance, displayed in usable formats, and distributed in a timely fashion. This element supports the Naval Warfare Mission Areas of Anti-Submarine Warfare, Anti-Surface Ship Warfare, Strike Warfare, Anti-Air Warfare, Command, Control, and Communications, and Mine Warfare. The physical environments of importance range from deep in the ocean bottom through the water column and into the atmosphere as high as the ionosphere. As military systems become more sophisticated and complex, knowledge of the oceanographic environment plays an ever more important role in the ultimate system performance and the development of superior tactics.

(U) This program element supports the following DOD Critical Technologies: Passive Sensors, Signal Processing, and Weapon System Environment.

C. ( ) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. ( ) FY 1990 Accomplishments:

a. (U) Expanded the Woods Hole Oceanographic Institution Program to emphasize Tactical Oceanography.

b. ( ) Developed method to find affecting bottom reverberation.

c. ( ) Analyzed data to show the robustness of as distributed detection systems.

d. (U) Developed techniques for regional and global air/ocean forecasting, improved atmospheric nowcasting.

e. (U) Developed expert and artificial intelligence aids for satellite image analysis of air/ocean/ice features.

f. (U) Developed Tactical Decision Aids for fleet command and control for optimum ship-track selection and sensor deployments.

g. (U) Developed Engineer's Refractive Effects Predictive System for radio-wave propagation research modeling.

h. (U) Developed a Persian Gulf electro-optical (E/O) system performance model and validated E/O sensing techniques.

2. ( ) FY 1991 Program:

a. (U) Continue and expand development of the tactical oceanography program, broadening range of program participents.

b. (U) Field test ocean thermal engine for autonomous environmental sampler (Slocum).

PROGRAM ELEMENT: 0602435N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: OCEAN & ATMOSPHERIC SUPPORT TECHNOLOGY
PROJECT NUMBER: N/A PROJECT TITLE: N/A

c. ( ) Complete simulation studies to prepare for field experiments.
d. ( ) Complete comprehensive to establish the advantages for distributed systems.
e. ( ) Deploy first full-scale, and improve sea ice prediction models and forecasting.
f. (U) Couple air and sea models to improve global/regional models using large-scale computers and shipboard processing.
g. (U) Continue assimilation of remote and in situ data into predictive models using advanced data-compaction techniques.
h. (U) Validate electromagnetic/optical propagation models based on coupled air-sea interaction data using joint service cooperation.
i. (U) Investigate remotely sensed and in situ data needs for ocean dynamic and acoustic propagation models.

3. ( ) FY 1992 Plans:
a. (U) Continue expanded tactical oceanography initiative.
b. ( ) Conduct experiment and evaluate tomographic techniques for matched field processing.
c. (U) Stress low-cost technologies for global-observing instrumentation.
d. ( ) Conduct in Project Spinnaker.
e. (U) Validate local-scale, open-ocean, eddy-resolving tactical models with data-assimilation capabilities.
f. (U) Develop coastal-zone and shallow-water air/sea predictive capabilities.
g. (U) Validate remotely sensed and in situ observation systems in coupled air/sea predictive systems.
h. (U) Incorporate advances in coupled air-sea modeling and transition acoustic and electromagnetic/optical propagation models to shipboard/shore station systems.

4. ( ) FY 1993 Plans:
a. ( ) Exploit
b. ( ) Measure and learn to exploit 3D inhomogeneity

c. (U) Continue global/regional/shipboard modeling and prediction capabilities on large-scale and shipboard computers.
d (U) Integrate expert systems and artificial intelligence into air/ocean modeling and prediction.
e. (U) Revise air/sea coupled models and determine historical statistical characterization parameters.
f. (U) Develop decision aids for electromagnetic and optical systems.

PROGRAM ELEMENT: 0602435N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: OCEAN & ATMOSPHERIC SUPPORT TECHNOLOGY
PROJECT NUMBER: N/A PROJECT TITLE: N/A

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: David Taylor Research Center, Bethesda, MD; Naval Air Development Center, Warminster, PA; Naval Oceanographic and Atmospheric Research Laboratory, Stennis Space Center, MS; Naval Research Laboratory, Washington, D.C.; Naval Ocean Systems Center, San Diego, CA; Naval Underwater Systems Center, New London, CT. CONTRACTORS: Applied Physics Laboratory, University of Washington, Seattle, WA; Applied Research Laboratory, University of Texas, Austin, TX; Institute for Naval Oceanography, NSTL, MS; Marine Physical Laboratory, Scripps Institution of Oceanography, La Jolla, CA; Woods Hole Oceanographic Institution, Woods Hole, MA.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
1. (U) TECHNOLOGY CHANGES: Not Applicable.
2. (U) SCHEDULE CHANGES: Not Applicable.
3. (U) COST CHANGES: In FY 1991, an increase of 6,000 was provided by Congress, of which 1,000 will support the core program and 5,000 will be used for Tactical Oceanography, accelerating development of key ASW system support and tactical environmental products.

F. (U) PROGRAM DOCUMENTATION: Not Applicable.

G. (U) RELATED ACTIVITIES: Programs are pursued jointly with P.E. 0602314N (ASW Technology) and P.E. 0603785N (ASW Environmental Acoustics Support).

H. (U) OTHER APPROPRIATION FUNDS: None.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Using Nunn Amendment funds in FYs 1991/1992, the U.S. Navy, in coordination with the Republic of Korea, is conducting a Coastal/Harbor Defense project to improve ASW defenses.

J. (U) MILESTONE SCHEDULE: Not applicable.

UNCLASSIFIED

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602936N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: INDEPENDENT EXPLORATORY DEVELOPMENT (IED)
PROJECT NUMBER: N.A. PROJECT TITLE: N.A.

A. (U) RESOURCES: (Dollars in Thousands)

TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMP.	TOTAL PROGRAM
IED	12,114	13,714	15,803	17,788	Cont.	Cont.

B. (U) DESCRIPTION: This program primarily provides discretionary funds to the Technical Directors (TDs) of Navy R&D Centers for exploiting new and highly innovative technologies which can be applied to Navy and Marine Corps problems. The discretionary nature of the program provides the R&D Centers a flexible means for quickly responding to fast-changing Fleet requirements with high-payoff, cutting-edge technology solutions. Task programming is done on an annual basis, utilizing creative ideas proposed by in-house "bench" scientists and engineers. Ongoing and completed efforts are subject to review by the Director, Office of Naval Technology (ONT), on an after-the-fact basis. As a result of these reviews, project evaluations and program assessments are provided as guidance to the R&D Center TDs for future planning purposes.

(U) This Program Element also provides funds for on-site technical support of Fleet Operational Commands through the Navy Scientific Assistance Program (NSAP). This effort fosters short-term technological solutions addressing immediate Fleet problems. Direct technology transitions from the laboratories to the Fleet are effected in conjunction with the two-year details of certain scientists and engineers from Navy R&D Centers and Laboratories as Science Advisors to Fleet units in the Atlantic, Pacific and Mediterranean Commands.

(U) Also funded under this program is the ONT Postdoctoral Fellowship Program. Recent Ph.D recipients are selected and placed at Navy R&D Centers and Laboratories to perform approved research in scientific and technical areas of special interest to the Navy.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

a. (U) Demonstrated feasibility of a novel low-cost, compact laser ignitor concept for warhead fuzing.

b. (U) Developed tipjet energy-loss optimization characteristics and methods for selecting nozzle duct width, turning radius and spanwise width for advanced naval aircraft.

c. (U) Developed concept for a compact, electromagnetically-shielded on-chip thin-film transformer to provide power to, and to route high frequency signals to and from, integrated circuits.

d. (U) Significant advances were achieved in conjunction with the details of 28 Science Advisors from various Navy R&D Centers and Laboratories, providing solutions to immediate Fleet requirements including a Special Forces night vision capability; a low-cost, expedient air-to-sea logistics delivery system; and wide-area-search equipment and methodology for differentiating floating mines from certain background clutter.

e. (U) Appointed and placed 40 new Fellows at host Navy R&D Centers and Laboratories and reappointed 27 Fellows for their second or third year to perform approved research to develop technology bases in Engineering, Physical, Mathematical, Social and Life Sciences.

UNCLASSIFIED

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602936N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: INDEPENDENT EXPLORATORY DEVELOPMENT (IED)
PROJECT NUMBER: N.A. PROJECT TITLE: N.A.

2. (U) FY 1991 Program:

a. (U) The FY 1991 In-House Laboratory IED Program will support high-risk, innovative R&D projects carefully reviewed and selected by the TDs of Navy Centers. Participating Centers will also publish previous year accomplishments, and half of them will host on-site, prior-year program reviews held at each center every other year. These annual reports and after-the-fact review evaluation reports by ONT are augmented by an annual symposium featuring presentations of lab-nominated "best" projects and displays to demonstrate to potential users and upper management the operative value of exploiting such ongoing efforts.

b. (U) The FY 1991 NSAP is based on a review of the FY 1990 program and will pursue, in response to high-priority requirements, state-of-the-art technology solutions to Fleet problems. The in-house and university-lab projects are coordinated with the assignments and objectives of scientific advisors to units in the Atlantic, Pacific and Mediterranean.

c. (U) The FY 1991 ONT Postdoctoral Fellowship Program will solicit, select and place approximately 45 new Fellows to conduct two-year investigations at as many of the 20 participating Navy R&D Centers and Laboratories as possible. The Fellows will foster personal interactions between center technical staff personnel and key associates at important degree-granting universities as well as those in relevant professional societies.

3. (U) FY 1992 Plans:

a. (U) The FY 1992 In-House Laboratory IED Program will support high-risk, innovative projects carefully selected by the TDs of Navy Centers. Participating Centers will publish prior year accomplishments and five will host on-site prior-year program reviews. These reports and reviews by ONT will be augmented by an annual symposium featuring presentations of lab-nominated "best" projects to demonstrate the operative value of such technological accomplishments.

b. (U) The FY 1992 NSAP will be based on a review of the FY 1991 program and will pursue high-priority Fleet requirements for state-of-the-art solutions to be implemented by Science Advisors assigned to units in the Atlantic, Pacific and Mediterranean Commands.

c. (U) The FY 1992 ONT Postdoctoral Fellowship Program will place approximately 48 new Fellows to conduct two-year research projects at participating host R&D Centers and Laboratories.

4. (U) FY 1993 Plans:

a. (U) The FY 1993 In-House Laboratory IED Program will support high-risk, innovative projects carefully reviewed and selected by the TDs of Navy R&D Centers who publish previous year accomplishments annually and host on-site prior year program reviews every other year.

b. (U) The FY 1993 NSAP will be based on a review of the FY 1992 program and will pursue high-priority Fleet requirements for timely solutions by Science Advisors assigned to Fleet Commands.

c. (U) The FY 1993 ONT Postdoctoral Fellowship Program will place approximately 50 new Fellows at host R&D Centers and Laboratories.

UNCLASSIFIED

UNCLASSIFIED

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602936N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: INDEPENDENT EXPLORATORY DEVELOPMENT (IED)
PROJECT NUMBER: N.A. PROJECT TITLE: N.A.

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: DTRC, Bethesda, MD; NADC, Warminster, PA; NCEL, Port Hueneme, CA; NCSC, Panama City, FL; NOSC, San Diego, CA; NPRDC, San Diego, CA; NRL, Washington, D.C.; NSWC, Dahlgren, VA; NTSC, Orlando, FL; NUSC, Newport, RI; NWC, China Lake, CA; CONTRACTORS: Applied Physics Laboratory/University of Washington, Seattle, WA; American Society for Engineering Education (Grantee), Washington, DC.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.
2. (U) SCHEDULE CHANGES: Not applicable.
3. (U) COST CHANGES: Not applicable.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: PE 0601152N, Laboratory Independent Research; PE 0602121N, Surface Ship Technology; PE 0602314N, Anti-Submarine Warfare Technology; PE 0602323N, Submarine Technology; PE 0602111N, Anti-Air/Anti-Surface Warfare Technology.

H. (U) OTHER APPROPRIATION FUNDS: None.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

J. (U) MILESTONE SCHEDULE: Not applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603109N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: INTEGRATED AIRCRAFT AVIONICS

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W1953	INEWS	2,443	4,954	25,158	24,328	Cont.	Cont.
W1954	ICNIA	1,992	0	0	0	0	0
TOTAL		4,435	954	25,158	24,328	Cont.	Cont.

B. (U) DESCRIPTION: This program element provides Navy unique funding for the tri-Services Integrated Electronic Warfare System (INEWS) and the Integrated Communications, Navigation, Identification Avionics (ICNIA) effort. The goal of the Integrated Aircraft Avionics program is to be responsive to Congressional/OSD direction regarding modular avionics. INEWS/ICNIA removes/reduces risk from aircraft program decisions to incorporate modular avionics by eliminating/reducing the need for avionics development from airframe development programs.

The Air Force, as the lead service, is developing a new family of advanced technology integrated aircraft avionics modules for next generation aircraft. Very High Speed Integrated Circuits (VHSIC) and Monolithic Microwave Integrated Circuits (MMIC) are extensively utilized in the INEWS/ICNIA development. The Navy will develop Navy unique modules, and configure functional systems/subsystems from these and the set of jointly funded and developed INEWS and ICNIA modules for use in naval applications. Both hardware and software will be designed in accordance with the specifications and standards developed by the Joint Integrated Avionics Working Group (JIAWG) for the Common Avionics Baseline (CAB) and the Advanced Avionics Architecture (A3). The software for both INEWS and ICNIA will be written in the Ada programming language which will significantly reduce the high cost of software maintenance and update. Supportability in all areas will be a key INEWS/ICNIA design consideration. The integration of INEWS and ICNIA into an A3 compatible aircraft will significantly raise aircrew EW situational awareness, improve mission effectiveness, enhance survivability, reduce the aircrew workload, increase force readiness and reduce life cycle cost. INEWS and ICNIA developed modules have retrofit application to all existing Navy and Marine Corps aircraft through independent technology insertion efforts.

The INEWS project is managed by a NAVAIRSYSCOM Detachment at Wright Patterson AFB, OH, in close coordination with the Air Force SEEK SPARTAN and Advanced Tactical Fighter (ATF) programs.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603109N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: INTEGRATED AIRCRAFT AVIONICS
PROJECT NUMBER: W1953 PROJECT TITLE: INTEGRATED ELECTRONIC WARFARE SYSTEMS (INEWS)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W1953	INEWS	2,443	4,954	25,158	24,328	Cont.	Cont.

B. (U) DESCRIPTION: INEWS is an advanced development program to develop electronic warfare components, modules and systems to enhance aircraft effectiveness and improve survivability. To improve reliability and maintainability and reduce life cycle costs, INEWS developed modules will conform, to the maximum extent possible, to Joint Integrated Avionics Working Group (JIAWG) approved specifications for Advanced Avionics Architecture (A3). INEWS capitalizes on previous investment made during the development of advanced aircraft, such as the A-12 and ATF, but is not contingent upon the further development of these platforms. The INEWS project will develop the technology and produce a limited number of modules/components for Demonstration/Validation (DEM/VAL), demonstrate the performance and technical maturity of these components in both an Integrated Test Facility and DEM/VAL Flight Test Bed, and assist in the programmatic transition of selected subprojects to a different Program Element for Full Scale Engineering Development (FSED).

The INEWS project is comprised of several subprojects (Missile Warning System, Laser Warning System, Radar Warning Receiver, Advanced Expendables, etc.) which are at varying stages of design maturity. INEWS is not a "black box" to be installed in aircraft, but, rather, a development effort which will yield a set of modules with specific functional and physical characteristics and interfaces. Selected INEWS developed modules will be integrated into a platform (or system/ subsystem), as required to satisfy the functional requirements, while still maintaining hardware and software commonality with modules selected for use in other applications. INEWS developed modules have application to all new aircraft design efforts and retrofit application to all existing aircraft improvement programs.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:
   a. (U) Completed development of (Air Force ATF) ADMs and conducted Contractor laboratory/flight testing.
   b. (U) Continued to support integration into advanced Navy aircraft.
   c. (U) Conducted advanced flare flight envelope test.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603109N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: INTEGRATED AIRCRAFT AVIONICS
PROJECT NUMBER: W1953 **PROJECT TITLE:** INTEGRATED ELECTRONIC WARFARE SYSTEMS (INEWS)

2. (U) FY 1991 PROGRAMS:
   a. (U) Conduct Navy aircraft INEWS/SEEK SPARTAN Missile Warning System installation study for the F/A-18C and F-14D.
   b. (U) Commence Navy Flight Test Bed (FTB) modification engineering.
   c. (U) Commence PMTC INEWS System Integration Lab (SIL) development.
   d. (U) Continue Advanced Technology Expendables and Dispenser Systems (ATEDS) development.
   e. (U) Complete prototype reduced aperture Low Band DF antenna.
   f. (U) Initiate procurement packages for FY92 Navy INEWS contracts.

3. (U) FY 1992 PLANS:
   a. (U) Continue to support integration into advanced Navy aircraft.
   b. (U) Commence advanced development of INEWS derivatives for USN aircraft.
   c. (U) Commence Navy Flight Test Bed Modification.
   d. (U) Continue development of PMTC INEWS SIL.
   e. (U) Procure INEWS modules for Navy DEM/VAL testing.
   f. (U) Commence Cost and Operational Effectiveness Analysis (COEA) for Navy unique modules. The current schedule for completion of COEAs is:
      1. (U) Radar Warning Receiver - FY93/4Q
      2. (U) Missile Warning/Laser Warning - FY94/4Q
      3. (U) Electronic Support Measures - FY95/4Q
      4. (U) Defensive Electronic Countermeasures - FY95/4Q
      5. (U) Infrared Countermeasures - FY96/4Q
      6. (U) Electro-Optical Countermeasures - FY97/4Q
      7. (U) Coordinated Countermeasures - FY97/4Q

4. (U) FY 1993 PLANS:
   a. (U) Continue to support integration into Navy aircraft.
   a. (U) Continue DEM/VAL for Navy unique modules in INEWS SIL.
   c. (U) Continue DEM/VAL for Navy unique modules in FTB.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRDEVCEN Warminster PA; NAVWPNSUPPCEN Crane IN; NAVAIRTESTCEN Patuxent River MD; NAVAVIONICCEN Indianapolis IN; NAVWPNSCEN China Lake CA; COMPACMISTESTCEN Point Mugu CA; NRL Washington DC. CONTRACTORS: TRW, San Diego CA: Sanders Assoc., Nashua NH; General Electric, Utica NY; Westinghouse Electric Co., Baltimore MD.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603109N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: INTEGRATED AIRCRAFT AVIONICS
PROJECT NUMBER: W1953 PROJECT TITLE: INTEGRATED ELECTRONIC WARFARE SYSTEMS (INEWS)

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
1. (U) TECHNOLOGY CHANGES: None.
2. (U) SCHEDULE CHANGES: None.
3. (U) COST CHANGES: None.

F. (U) PROGRAM DOCUMENTATION: TOR: N/A NDCP: N/A
OR: #200-05-87 TEMP: N/A

G. (U) RELATED ACTIVITIES: PE 0603109N, Integrated Aircraft Avionics, Project 1954, Integrated Communications, Navigation and Identification Avionics (ICNIA). PE 0604250F, Project 3389, INEWS, Project 3393 ICNIA, Project 3786, Integrated Communications Security, and Project 3858, SEEK SPARTAN. All these projects are responsive to Congressional/OSD direction to develop new avionics systems in compliance with JIAWG approved specifications for modular avionics. Navy INEWS subprojects are coordinated with Air Force efforts by on-site Navy representation within the Air Force program management organization.

PE 0604270N, Consolidated Electronic Warfare. INEWS modules/components which successfully demonstrate adequate performance and technical maturity to support transition to Full Scale Development (FSD) will transition to a new Program Element. It is anticipated that most subprojects will transition to this Consolidated EW PE for FSED.

H. (U) OTHER APPROPRIATION FUNDS:

FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Not Applicable					

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

J. (U) MILESTONE SCHEDULE: Completions.

	MS-1	MS-II
INEWS	4Q/FY84	
1. (U) Modular Radar Warning Receiver		4Q/FY93
2. (U) Modular Missile/Laser Warning		4Q/FY94
3. (U) Advanced Kinematic Expendable		3Q/FY95
4. (U) Modular Electronic Support Measures		4Q/FY95
5. (U) Advanced RF Expendable		4Q/FY95
6. (U) Modular Electronic Countermeasures		4Q/FY96
7. (U) Advanced Electro-Optic Countermeasures		4Q/FY97

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603207N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGR
X0513	Air/Ocean Prediction	1,289	1,564	1,549	1,608	Cont.	Cont.
X0514	Air/Ocean Shipboard Measurements	1,930	1,328	2,180	2,227	Cont.	Cont.
X0948	Precise Time/Time Interval	2,067	1,423	1,491	1,544	Cont.	Cont.
X2008	Tactical Ocean Data Assimilation and Prediction	2,463	2,861	2,716	2,938		
	TOTAL	7,749	7,176	7,936	8,317		

B. (U) DESCRIPTION: This program provides a shipboard environmental support capability to optimize weapon, sensor and platform performance as a function of the changing ocean and atmosphere. These projects support the infrastructure needed to provide Force Commanders with timely environmental data needed to make tactical decisions to avoid, mitigate or exploit environmental effects. Present shipboard environmental systems are outdated, slow, and incapable of meeting the atmospheric and oceanographic data requirements of modern Naval weapon systems and tactics. The Air/Ocean Prediction project develops computer-based oceanic and atmospheric analysis and prediction models which emphasize the air/ocean interface, an area critical for Naval operations. The Air/Ocean Shipboard Measurements project provides for the advanced development of sensors, communication interfaces, processing and display systems to measure, distribute and display oceanographic and atmospheric parameters. The Precise Time and Time Interval project upgrades the Department of Defense time reference standard and improves dissemination methods critical to strategic missile system accuracy requirements. Strategic Defense Initiative, satellite navigation improvements and jam-proof, secure communications requirements are also included. The Tactical Ocean Data Assimilation and Prediction project maximizes the effectiveness and availability of remotely sensed and conventional oceanographic data needed to enhance warfighting capabilities of the Fleet in such areas as Anti-Submarine Warfare, Anti-Air Warfare, Strike Warfare, and Amphibious Warfare.

FY 1992/1993 RDT&E NAVY DESCRIPTIVE SUMMARY
PROGRAM ELEMENT: 0603207N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications
PROJECT NUMBER: X0513 PROJECT TITLE: Air/Ocean Prediction

C. (U) DESCRIPTION: This project develops Large Scale Computer numerical oceanic and atmospheric models, such as the Thermodynamic Ocean Prediction System (TOPS) and the Navy Operational Global Atmospheric Prediction System (NOGAPS). Other models under development focus on sea ice, ocean thermal structure and circulation prediction. The project also supports development of environmentally related Tactical Decision Aids (TDA), as well as command and control products (C2).

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:
   a. (U) Completed strike warfare prototype TDAs.
   b. (U) Completed development of the TOPS 3.0.

2. (U) FY 1991 PROGRAM: Initiate the NOGAPS 4.0 model development; Continue development of global (non-eddy resolving) ocean circulation forecast model.

3. (U) FY 1992 PLANS: Complete development of global (non-eddy resolving) ocean circulation forecast model; begin development of fine resolution regional ocean thermal structure forecast models; continue next generation of C2 support products including specific warfare area TDAs.

4. (U) FY 1993 PLANS: Begin development of global (eddy resolving) coupled air/ocean circulation and thermal structure forecast models; begin incorporating knowledge-based/expert system technology into air/ocean prediction systems.

5. (U) PROGRAM TO COMPLETION: This is a continuing program. Continue development of Air/Ocean Models to improve predictive capability.

E. (U) WORK PERFORMED BY: IN-HOUSE: NOARL, Monterey, CA; NOARL, Bay St. Louis, MS; and NRL, Washington, DC. CONTRACTORS: None.

F. (U) RELATED ACTIVITIES: PE 0603704N, ASW Oceanography;
PE 0305111N, Weather Service; PE 0604230N, Warfare Support Systems.

G. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603207N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications
PROJECT NUMBER: X0514 **PROJECT TITLE:** Air/Ocean Shipboard Measurements

C. (U) **DESCRIPTION:** This project provides for the advanced development of sensors, communication interfaces, and processing and display equipment to measure, distribute and display atmospheric and oceanographic parameters essential to the optimum employment of naval warfare sytems. With these systems, on-scene commanders can continuously and automatically monitor the changing atmospheric and oceanographic environment allowing them to optimize performance of his weapons, sensors and platforms.

D. (U) **PROGRAM ACCOMPLISHMENTS AND PLANS**

1. (U) FY 1990 ACCOMPLISHMENTS:

a. (U) Continued development of communication interface with Navy Command and Control System (NCCS) Afloat.

b. (U) Began development of the Navy Oceanographic Data Distribution and Expansion System (NODDES) data processing system.

c. (U) Completed Shipboard Meteorological and Oceanographic Observing System (SMOOS) sensor technology development.

d. (U) Began data compression demonstration for environmental data transmission.

2. (U) FY 1991 PROGRAM: Complete communications interface with NCCS Afloat. Continue development of communication interfaces with warfare planning systems and data compression (fractal) techniques.

3. (U) FY 1992 PLANS: Continue communication system and shipboard interface, processing and display system development; Begin development of Advanced Weather Radar.

4. (U) FY 1993 PLANS: Complete development of shipboard interface and data compaction techniques; begin advanced development of next generation communication, processing and display systems; Continue development of SMOOS sensor upgrades

5. (U) PROGRAM TO COMPLETION: This is a continuing program. Continue implementation of environmental data into Command and Control.

E. (U) **WORK PERFORMED BY:** IN-HOUSE: NOARL, Monterey, CA; NOSC, San Diego, CA; NRL, Washington, DC; NAVELEXCEN, Vallejo, CA. CONTRACTOR: Lockheed, Austin, TX.

F. (U) **RELATED ACTIVITIES:** PE 0604218N, Air/Ocean Equipment Engineering; PE 0604230N, Warfare Support System.

G. (U) **OTHER APPROPRIATION FUNDS:** This is a non-acquisition program.

H. (U) **INTERNATIONAL COOPERATIVE AGREEMENTS:** None.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603207N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications
PROJECT NUMBER: X0948 PROJECT TITLE: Precise Time/Time Interval

C. (U) DESCRIPTION: Upgrade the accuracy of the Naval Observatory's Master Clock System (MCS) for DoD surface, subsurface, air and shore communications, navigation and time dissemination systems. Develop advanced detectors and an optical interferometer to study radio and optical sources used for precise star determination.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:
   a. (U) Continued upgrade of the Master Clock System (MCS).
   b. (U) Multiple-array CCD sensor testing completed.
   c. (U) Large optics designed.

2. (U) FY 1991 PLANS: Multiple-array CCD sensor testing through test measurement of bright navigation stars; interferometer control programs test, site layout, and metrology design; fast delay line prototype delivered.

3. (U) FY 1992 PLANS: Interferometer computer control testing; CCD multiple arrays installed on transit telescope.

4. (U) FY 1993 PLANS: CCD array evaluation; interferometer testing/installation of delay lines.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORKED PERFORMED BY: Naval Observatory, Washington, DC; Naval Research Laboratory, Washington, DC. CONTRACTORS: None.

F. (U) RELATED ACTIVITIES: None.

G. (U) OTHER APPROPRIATION FUNDS: None.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603207N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications
PROJECT NUMBER: X2008 **PROJECT TITLE:** Tactical Ocean Data Assimilation and Prediction

C. (U) This project develops new means of environmental data assimilation, including in-situ and satellite data, and includes the development of tactical models to utilize these data. The information will assist Battle Group Commanders in the optimum employment weapon systems, especially those known to be sensitive to environmental factors. The evolving Navy Environmental Operational Nowcasting System (NEONS) software system will manage, assimilate and inject data into tactical air/ocean models.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:
   a. (U) Continued NEONS development.
   b. (U) Began development of range dependent Electromagnetic/Electro-Optical performance models.
   c. (U) Completed Navy Operational Gulf Stream Forecasting System.

2. (U) FY 1991 PROGRAM: Develop advanced feature models for the Gulf Stream; begin adapting Radio Parabolic Equation (RPE) model for use with surface based systems; begin development of Greenland, Iceland, Norway Sea (GINSEA) tactical scale model; complete NEONS development.

3. (U) FY 1992 PLANS: Continue development of GINSEA models; complete adapting RPE for surface based systems; begin next generation NEONS development.

4. (U) FY 1993 PLANS: Adapt data assimilation system to new observational methods (e.g., European Space Agency Remote Sensing Satellite-1, ground-based profilers, Next Generation Radar); complete GINSEA model; begin development of North Pacific eddy resolving model.

5. (U) PROGRAM TO COMPLETION: This is a continuing program. Continue to exploit new data sources from upcoming satellite launches.

E. (U) WORK PERFORMED BY: IN-HOUSE: NOARL, Monterey CA; NOARL, Bay St. Louis, MS; NRL, Washington, D.C.; NOSC, San Diego, CA. CONTRACTOR: None

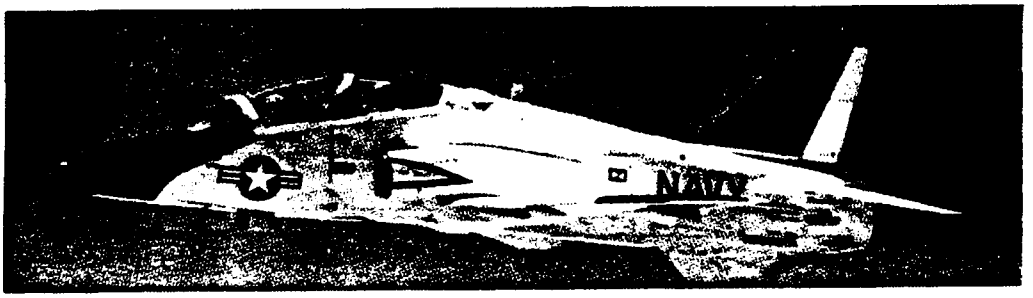
F. (U) RELATED ACTIVITIES: PE 0305111N, Weather Service; PE 0603704N, ASW Oceanography; PE 0604230N, Warfare Support Systems.

G. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603208N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: T-45 Training System (TS)
PROJECT NUMBER: W1142 **PROJECT TITLE:** T45TS



POPULAR NAME: GOSHAWK

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	TO COMPLETE
Program Milestones	DAB Review 11/89	MS IIIA 5/91	MS IIIA 2/92	MS IIIB 2/93 IOC 11/92	
Engineering Milestones				ACFT/SIM BASELINE ESTAB	
T&E Milestones		DT/OT-IIB 11/90 DT-IIC 5/91 OT-IIC 5/91	TECHEVAL 6/92	OPEVAL 10/92	
Contract Milestones				DEL ACFT #12 FOR IOC	

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603208N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: T-45 Training System (TS)
PROJECT NUMBER: W1142 PROJECT TITLE: T45TS

BUDGET ($K)	FY 1990	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL TO COMPLETE
Major Contract	22,449	7,323	0	0	537,976
Support Contract	170	225	500	200	4,226
In-House Support	3,805	7,254	5,977	1,690	39,564
Other					
TOTAL	26,424	14,802	6,477	1,890	581,766 0

B. (U) DESCRIPTION: The T45TS mission is to provide undergraduate jet pilot training for prospective carrier-based Navy and Marine Corps pilots, and selected international students, to meet aircrew requirements in the 1990's and beyond. Projected T-2 and TA-4 aircraft shortages due to attrition and service life expiration, as well as increasing operating and support costs, require development of a cost effective replacement, T45TS is a total training system concept which includes aircraft, simulators, academics and contractor logistics support.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. (U) Continued T&E of aircraft and ground training systems.
   b. (U) Incorporated hardware for resolution of development testing (DT)/operational testing (OT) deficiencies.
   c. (U) Completed Government In Plant & on-site test on first production simulators (IFT/OFT).
   d. (U) Completed Government In Plant & on-site test on FSD Training Integration System.
   e. (U) Completed on-site test for Computer Aided Instruction (Device 4E10)
   f. (U) Initiated Cockpit 21 (digital cockpit upgrade) concept study.
2. (U) FY 1991 Program:
   a. (U) Successfully demonstrated corrections for DT/OT IIA deficiencies. DT-IIB completed 6 Dec 90. OT-IIB completed 21 Dec 90. COMOPTEVFOR test report available March 91.
   b. (U) Continue T&E of aircraft and ground training systems.
   c. (U) Commence carrier suitability testing of aircraft.
   d. (U) Accepted first two pilot production aircraft.
   e. (U) Demonstrated adequate stall characteristics (the first phase of high angle of attack testing).
   f. (U) Develop and test DT/OT IIB corrections.
   g. (U) Continue Cockpit 21 concept studies through system design review.

PROGRAM ELEMENT: 0603208N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: T-45 Training System (TS)
PROJECT NUMBER: N1142 PROJECT TITLE: T-45TS

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS: "CONTINUED"

3. (U) FY 1992 Plans:
   a. (U) Conduct TECHEVAL.
   b. (U) Continue T&E of aircraft and ground training system including final portion of high angle of attack (HAOA).
   c. (U) Conduct Sea Trials for carrier suitability.
   d. (U) Commence OPEVAL.
4. (U) FY 1993 Plans:
   a. (U) Complete OPEVAL.
   b. (U) Conduct detailed system evaluation (OT III).
   c. (U) Extend clearances for ordnance and baggage container.
5. (U) Program to Completion: Program to complete in FY 1993.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRTESTCEN, Patuxent River, MD; NTC, Orlando, FL; NAVAIRPROPCEN, Trenton, NJ; NAVAIRENGCEN, Lakehurst, NJ.
CONTRACTORS: McDonnell Douglas Aircraft, St. Louis, MO.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
1. (U) Technology Changes: Not applicable.
2. (U) Schedule Changes: TECHEVAL, OPEVAL, MS IIIA (FY 92) and MS IIIB (FY 93) current estimates reflect the thresholds in the T45TS approved baseline. MS IIIA (FY 91) has changed due to slips in the schedule for DT/OT IIB, which is a prerequisite to the Defense Acquisition Board. IOC (defined as delivery of the 12th aircraft and associated ground training systems) has changed from June 1991 to November 1992 to reflect the move of the program from Long Beach, CA to St. Louis, MO and for the time required to incorporate slatted wings in the production schedule. A Conventional System Committee program review was held on 10 Jan 91 to review these schedule changes to the Defense Enterprise Program baseline.
3. (U) Cost Changes: Not applicable.

F. (U) PROGRAM DOCUMENTATION:

Mission Element Need Statement	6/79	
Acquisition Plan	9/90	(update in process)
Navy Training Plan	6/87	(1990 revision in process)
TEMP	6/89	(Revision 4 in process; signed by ASN (RDA) 10 Dec 90)
DCP	12/87	
ILSP	5/90	

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603208N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: T-45 Training System (TS)
PROJECT NUMBER: W1142 PROJECT TITLE: T45TS

G. (U) RELATED ACTIVITIES: P.E. 0603216N, Aircrew Systems Technology; P.E. 0604203N, Standard Avionics Development; P.E. 0604264N, Aircrew Systems Development.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

		FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
	QTY	(0)	(0)	(12)	(36)	(240)	
	APN P1	125,658	159,154	368,319	350,830	4,156,051	6,032,631
(U)	MILCON	11,800		17,400	6,700		45,100

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: This information is contained in the Congressional Data Sheets.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603210N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: AIRCRAFT PROPULSION
PROJECT NUMBER: W2014 PROJECT TITLE: INTEGRATED HIGH PERFORMANCE TURBINE ENGINE TECHNOLOGY (IHPTET)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W2014	IHPTET	7,033	7,129	7,542	7,711	Cont.	Cont.

B. (U) DESCRIPTION: The IHPTET project integrates Exploratory Development effort in materials and propulsion components culminating in Advanced Development technology propulsion demonstrations fully coordinated among the Army, Air Force, DARPA, NASA, and the propulsion industry. Navy participation ensures IHPTET advanced technology payoffs meet Navy needs. IHPTET demonstration categories are : (1) fighter/attack (Joint Technology Demonstrator Engine [JTDE]), (2) turboprop/shaft (Joint Turbine Advance Gas Generator (JTAGG) and (3) missile/expendable engines (Joint Expendable Turbine Concepts [JETEC]).

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:
1. (U) FY 1990 Accomplishments:
   a. (U) Awarded turboshaft engine contracts.
   b. (U) Started PW699 turbofan engine tests.
2. (U) FY 1991 Program:
   a. (U) Award missile and turbofan engine contracts.
   b. (U) Conduct turboshaft tests and complete PW699 tests.
3. (U) FY 1992 Plans:
   a. (U) Test turbofan, turboshaft and missile engines.
4. (U) FY 1993 Plans:
   a. (U) Initiate turboshaft Phase II contract.
   b. (U) Test turbofan, turboshaft and missile engines.
5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRPROPCEN, Trenton, NJ; NAVAIRDEVCEN, Warminster, PA. CONTRACTORS: GE, Evendale OH and Lynn, MA; P&W Aircraft, West Palm Beach, FL; Lycoming, Stratford, CT; Garrett Turbine Engine, Phoenix, AZ.

E. (U) RELATED ACTIVITIES: Joint service MOU's with Army and Air Force. Navy: P.E. 0602122N Aircraft Technology; P.E. 0602234N System Support Technology; Air Force: P.E. 0603216F Advanced Turbine Engine Gas Generator, P.E. 0603202F Aircraft Propulsion Subsystem Integration; Army: P.E. 0603003A Aviation Advanced Technology.

F. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603216N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Aircrew Systems Technology

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE
M0097	Aircrew Impact Injury Prevention	2,797	3,009	2,628	2,497	CONT.
W0584	Aircrew Systems Technology	9,130	10,356	7,758	6,806	CONT.
	TOTAL	11,927	13,365	10,386	9,303	CONT.

B. (U) DESCRIPTION: Aircrew Systems Technology is a tri-service coordinated advanced development program. It consists of two complementary projects: Project M0097, Aircrew Impact Injury Prevention (AIIP) and Project W0584, Aircrew Systems Technology (AST). Project M0097 develops human dynamic and injury response models (IRM) to impact acceleration and determines the correlation of these dynamic responses with the physiological effects and injuries. Project W0584 uses these models to develop and functionally integrate systems and equipment to ensure aircrew protection against natural and induced environmental or physiological hazards encountered during routine, combat and emergency flight operations as well as during escape, survival and rescue, following loss of the aircraft.

PROGRAM ELEMENT: 0603216N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AIRCREW SYSTEMS TECHNOLOGY
PROJECT NUMBER: M0097 PROJECT TITLE: AIRCREW IMPACT INJURY PREVENTION

C. (U) DESCRIPTION: This project develops human dynamic and injury response models of impact acceleration and determines the correlation of these dynamic responses with physiological effects and injuries. These models will be used to evaluate human protective systems designed to prevent impact type injuries.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. (U) Collected human response data for vertical +Gz impact without head mounted devices.
   b. (U) Developed preliminary human -Gx injury model.
   c. (U) Draft standards for human surrogate impact testing.
2. (U) FY 1991 Program:
   a. (U) Collect human response data for vertical +Gz impact with head mounted devices.
   b. (U) Complete dynamic and injury model for on-axis -Gx human impact response.
   c. (U) Publish standard human response data for -Gx, +Gy, +Gz.
3. (U) FY 1992 Plans:
   a. (U) Collect human response data for off-axis +Gz, -Gx impact without head mounted devices.
   b. (U) Publish preliminary on-axis +Gz, -Gx impact reponse guidelines for head-mounted devices.
   c. (U) Publish updated safe/unsafe acceleration guide.
   d. (U) Test/evaluate Phase I Biofidelic Manikin (BFM).
4. (U) FY 1993 Plans:
   a. (U) Collect human response data for off-axis +Gz, -Gx impact with head mounted devices.
   b. (U) Publish preliminary dynamic/injury model of off-axis +Gz, -Gx human impact response.
   c. (U) Publish preliminary head-mounted device off-axis response guidelines.
   d. (U) Test/evaluate Phase II BFM.
5. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVBIODYNLAB, New Orleans, LA.; NAVAIRDEVCEN, Warminster, PA; NAVMEDRSCHINSTITUTE, Bethesda, MD; Naval Aerospace Medical Research Laboratory, Pensacola, FL. CONTRACTORS: Maryland Medical Laboratory, Baltimore, MD; Crescent Ltd, New Orleans, LA (Medical Evaluations); University of New Orleans; GSA Technical Services, Ft. Worth, Texas. OTHER: USAF Armstrong Aeromedical Research Laboratory, Dayton, OH; USA Aeromedical Research Laboratory, Ft Rucker, AL; NASA Johnson Space Center, Houston, TX; Department of Transportation, Wash., DC

F. (U) RELATED ACTIVITIES: All Aviation Life Support System projects are controlled to eliminate duplication and ensure commonality by the Tri-Service Life Support Equipment RDT&E Steering Committee, the joint Environmental Working Group (FLIGHT), the Tri-service Aerospace Medical Research Panel and Technical Working Groups in biodynamics and vibrations/acoustics.

G. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable

PROGRAM ELEMENT: 0603216N **BUDGET ACTIVITY: 4**
PROGRAM ELEMENT TITLE: Aircrew Systems Technology
PROJECT NUMBER: W0584 PROJECT TITLE: Aircrew Systems Technology

C. (U) DESCRIPTION: Develops technology for functionally integrated aircrew life support systems designed to ensure crew protection and enhance crew performance. Initiate an F/A-18 compatible Navy Combat Edge (CE) System to enhance combat capability of current aircraft and transition Combat Edge through Milestone II.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

a. (U) Continued Aircrew Integrated Life Support System (AILSS), Laser Visor Eye Protection (LVEP), Medium Energy Laser Eye Protection (MELEP), Advanced Technology Crew Station (ATCS) and 21st Century Head Protection (21st CHP) programs.

b. (U) Initiated Combat Edge, Helmet Mounted Display/Sight (HMD/S), Crashworthiness (CW) and Advanced Oxygen Delivery System (AODS) programs.

2. (U) FY 1991 Program:

a. (U) Transition Combat Edge.

b. (U) Continue AILSS, LVEP, MELEP, ATCS, 21st CHP, CW, AODS, programs.

c. (U) Initiate Frequency Agile Laser Eye Protection (FALEP) and BioFidelic Manikin (BFM) programs.

3. (U) FY 1992 Plans:

a. (U) Continue AILSS, LVEP, MELEP, FALEP, ATCS, 21st CHP, CW, AODS, and BFM programs.

b. (U) Transition 21st CHP Program

4. (U) FY 1993 Plans:

a. (U) Transition AILSS, LVEP, MELEP, 21st CHP, and AODS.

b. (U) Continue MELEP, ATCS, CW, and BFM program.

c. (U) Initiate Patrol and Transport Aircraft Escape and Survival System (VP/VC ESS) Program.

5. (U) Program to completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE:NAVAIRDEVCEN,Warminster, PA; NAVWPNCEN, China Lake, CA; NAVORDSTA, Indian Head, MD; CONTRACTORS: Boeing Advanced Systems Division, Seattle, WA; McDonnell Douglas, St. Louis, MO; Gentex Inc., Carbondale, PA; Northrop Aircraft, Los Angeles, CA. OTHERS: USAF Wright Aeronautical Laboratories (AFWAL), Dayton, OH.

F. (U) RELATED ACTIVITIES: P. E. 0602201F: Aerospace Flight Dynamics; P. E. 0602233N: Mission Support Technology; P. E. 0604264N: Aircrew System Development; and P. E. 0604706F: Aircrew System Development

G. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603217N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: ADVANCED AIRCRAFT SUBSYSTEMS
PROJECT NUMBER: W0446 PROJECT TITLE: ADVANCED AVIONICS SUBYSTEMS

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0446	AS&T	6,560	5,857	6,004	6,198	CONT	CONT

B. (U) DESCRIPTION: Develops/demonstrates surveillance sensors, avionics packaging/data bus/architecture, situation awareness/visionics; evaluates subystems of other Services. Goals include improved surveillance, detection, classification of threats/targets; demonstrations of avionics system's architectural concepts; insertion of emerging technologies such as Very High Speed Integrated Circuit (VHSIC), Microwave/Millimeter-wave Monolithic Integrated Circuit (MIMIC), etc.; increased tri-service avionics commonality; lighter, more reliable, affordable and effective systems/subsystems.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. (U) Continued tri-service/industry Joint Integrated Avionics Working Group (JIAWG) development, coordination and partcipation.
   b. (U) Completed 32-bit parallel (PI) bus interface Unit(BIU) chip set.
   c. (U) Continued development of situational awareness/visionics aids.
   d. (U) Developed specification for a Sensor Data Distribution Network
   e. (U) AF awarded joint Special Airborne Antenna System(SAAS) contract.
   f. (U) Completed systems study classifed rf subsystems.
2. (U) FY 1991 Program:
   a. (U) Initiate design of standard optical backplane architecture.
   b. (U) Complete feasibility study of classified rf subsystem.
   c. (U) Continue situational awareness/visionics development.
   d. (U) Complete dual PI-bus interface chip test and evaluation.
   e. (U) Continue JIAWG development, coordination and participation.
3. (U) FY 1992 Plans:
   a. (U) Continue situational awareness/visionics development.
   b. (U) Continue development of optical backplane.
   c. (U) Initiate demonstration phase of the joint SAAS effort.
   d. (U) Initiate demonstration of classified rf sensor subsystem.
   e. (U) Continue JIAWG development, coordination and participation.
4. (U) FY 1993 Plans:
   a. (U) Continue situational awareness/visionics development.
   b. (U) Continue demonstration of classified rf sensor subsystem.
   c. (U) Complete composite avionics packaging demonstration.
   d. (U) Continue JIAWG development, coordination and participation
5. (U) Program to Completion: This a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NADC, Warminister, PA; NAC, Indianapolis, IN; NRL, Washington, DC; DESA, Albuquerque, NM; CONTRACTORS: IBM FSD, Manassas, VA; Cambridge Research Associates, Vienna, VA; E. (U) RELATED ACTIVITIES: PE 0604203N, Standard Avionics Development; PE 0603109N, Integrated Avionics Systems; PE 0603109F, PE 0603253F, PE 0603224F Pave Pillar/Pace.

F. (U) OTHER APPROPRIATION FUNDS: N/A

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0603222N **Budget Activity:** 4-Tactical Programs
Program Element Title: Skipper Enhancements
Project Number: W2004 **Project Title:** New Skipper Upgrades

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TOTAL PROGRAM
W2004	New Skipper Upgrades	11,323	0	0	0	54,014*

*Funded in P.E. 0603306N to FY 1988.

B. (U) DESCRIPTION: This program element provides for the development of improvements to the Skipper air-to-surface weapon system. This project is a result of an FY 1986 Congressional initiative which includes specific direction to develop a low-cost, laser guided training bomb (LGTR) and perform a tech demo program using the Army's Fiber Optic Guided Missile (FOG-M) technology on SKIPPER (FOG-S).

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:
   a. (U) LGTR development: Fab test rounds, conduct environmental and developmental flight tests, and complete mods to preliminary data package to support CDR.
   b. (U) Demonstration of air-launched fiber optic data link with additional unpowered drop tests.
   c. (U) Exploration of longer range payouts and plume-fiber interaction by incorporating propulsion (e.g. rocket motor and/or turbine) onto FOG-S air vehicle.
   d. ( )
   e. (U) Program is terminated.
2. (U) FY 1991 PROGRAM: Not applicable.
3. (U) FY 1992 PLANS: Not applicable.
4. (U) FY 1993 PLANS: Not applicable.
5. (U) PROGRAM TO COMPLETION: Not applicable.

D. (U) WORK PERFORMED BY: IN-HOUSE: Naval Weapons Center, China Lake, CA. CONTRACTOR: Loral Control Systems, Inc. OTHER: U.S. Army Missile Command, Redstone Arsenal, AL.

E. (U) RELATED ACTIVITIES: Not applicable.

F. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

FY 1990 Actual	FY 1991 Estimate	FY 1992 Estimate	FY 1993 Estimate	To Complete	Total Program

PROCUREMENT						
OPN	**7,500**	0	0	0	0	7,500

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1992/3 RDT&E NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603228N
PROGRAM ELEMENT TITLE: CV-ASW Module

BUDGET ACTIVITY: 4
PROJECT TITLE: CV-ASW Module

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROG.
S0517	3,377	3,605	3,967	3,603	Cont.	Cont.

B. (U) DESCRIPTION: This continuing program develops computer program and equipment improvements required to upgrade the Aircraft Carrier Antisubmarine Warfare Module (CV-ASWM). An integral part of the carrier Advanced Combat Direction System (ACDS), CV-ASWM provides mission support for embarked S-3 aircraft and CV Helicopters; ASW sensor data processing/analysis; and primary command, control and communications connectivity between air ASW weapon systems, ACDS, the ASW Commander and other battle force ASW components. Critical program needs are ongoing tactical interoperability with evolving combat direction systems and the continued capability to support both new and upgraded ASW aircraft software programs.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Completed revisions to Model 4.2 computer program for S-3B. Conducted Model 4.2 TECHEVAL.

2. (U) FY 1991 Program: Conduct Model 4.2 OPEVAL. Initiate development of Model 4.3 system to support ACDS Block 1, TESS, and JMTF.

3. (U) FY 1992 Plans: Continue development of Model 4.3 program.

4. (U) FY 1993 Plans: Complete development and testing of Model 4.3 and conduct TECHEVAL.

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NADC, Warminster, PA. CONTRACTORS: Intermetrics, Inc., Warminster, PA; Pacer Systems Inc., Horsham, PA

E. (U) RELATED ACTIVITIES: PE 0604518N CIC Conversion; PE0604231N Tactical Command System

F. (U) OTHER APPROPRIATION FUNDS: PROCUREMENT (Dollars in Thousands)

	FY 90 ACT	FY 91 EST	FY 92 EST	FY 93 EST	TO COMPLETE	TOTAL PROGRAM
OPN#72	4,119	4,020	9,840	5,390	Continuing	Continuing

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603231N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: NAVY ADVANCED TACTICAL FIGHTER/NEXT GENERATION FIGHTER
PROJECT NUMBER: W2051 **PROJECT TITLE:** NAVY ATF/NGF

PICTURE NOT AVAILABLE

POPULAR NAME: NATF

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	TO COMPLETE
Program	USAF/ATF	MSII			
Milestones	USAF/USN	Source Selection			
Engineering Milestones					
T&E Milestones					
Contract Milestones					

BUDGET ($K)	FY 1990	FY 1991	FY 1992	FY 1993	Program Total To Complete
Major Contracts	53,000	32,000	0	0	146,549/ 0
Support Contract	467	250	0	0	717/ 0
In-House Support	5,623	8,688	0	0	18,239/ 0
GFE/ Other	0	0	0	0	245/ 0
TOTAL	59,090	40,938	0	0	165,750/0

PROGRAM ELEMENT: 0603231N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: NAVY ADVANCED TACTICAL FIGHTER/NEXT GENERATION FIGHTER
PROJECT NUMBER: W2051 PROJECT TITLE: NATF ATF/NGF

B. (U) DESCRIPTION: The Navy Advanced Tactical Fighter (NATF) program was initiated to develop the next generation fighter for introduction early in the 21st century to counter the emergence of large numbers of long range threat platforms and a proliferation of high performance fighter platforms throughout the world. The NATF has designed to maintain fleet air superiority against these platforms. Program emphasis from the outset has been balanced on affordability, reliability, maintainability, performance, and survivability. The NATF Tentative Operational Requirement (TOR) specified a variant of the Air Force Advanced Tactical Fighter to replace the F-14. In June 1988, Navy modified the mission of NATF to reflect a strike-fighter role and satisfy Anti-Air Warfare (AAW) and Strike/Anti-Surface Warfare (STK/ASUW) warfighting requirements. The NATF program was terminated due to affordability constraints and the availability of sufficient capability within current generation F-14 aircraft to counter near term threats.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

a. (U) Results of the studies conducted in 1988, 1989, and 1990 were evaluated and incorporated into the design specification for source selection.

b. (U) Carrier suitability analyses were conducted: included structures and aerodynamic analyses and capability with CV launch and recovery systems.

c. (U) Marinization of USAF/ATF engine specifications.

d. (U) Investigated use of low observable technology.

e. (U) Wind tunnel testing for Navy variant continued at NASA Langley Research Center, NASA Ames Research Center and contractor facilities.

f. (U) Materials testing for composite structures in Navy variant was conducted.

2. (U) FY 1991 Program: Complete DEM/VAL Phase II. This includes USN field station engineering support for the following:

a. (U) Final assessment of the NATF design completed by airframe contractors in Phase II.

b. (U) Conduct final assessment of Phase II engine designs.

c. (U) Monitor USAF ground and flight tests.

d. (U) Complete DEM/VAL Phase II wind tunnel and radar cross section assessment of NATF design.

e. (U) Conduct ATF/NATF source selection with USAF from Jan - Apr 91 for airframe and engine.

f. (U) Terminate NATF Program.

PROGRAM ELEMENT: 0603231N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: NAVY ADVANCED TACTICAL FIGHTER/NEXT GENERATION FIGHTER
PROJECT NUMBER: W2051 **PROJECT TITLE:** NATF ATF/NGF

D. (U) **WORK PERFORMED BY:** IN-HOUSE: COMNAVAIRSYSCOM, Washington, DC; COM, AFSC, Aeronautical Systems Division, Wright-Patterson AFB, Dayton, OH. **CONTRACTORS:** Northrop Corporation, Aircraft Division, Hawthorne, CA; Lockheed California Co., Burbank, CA; United Technologies/Pratt and Whitney, West Palm Beach, FL; General Electric Co., Aircraft Engine Division, Evandale, OH.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Terminate at the conclusion of participation in source selection.

2. (U) Schedule Changes: Program terminated.

3. (U) Cost Changes: FY91 decrease of $24.727 terminates program at the completion of participation in source selection.

F. (U) PROGRAM DOCUMENTATION: TOR Update #4, 1 June 90; AP, 17 Sep 90; Program Charter, 17 Sep 90

G. (U) RELATED ACTIVITIES: USAF Advanced Tactical Fighter (ATF) Program Element 0603230F, Secretary of the Navy/Secretary of the Air Force Memorandum of Understanding of 4 Mar 86, and Secretary of the Navy/Secretary of the Air Force Memorandum of Understanding of 7 Jan 88.

H. (U) OTHER APPROPRIATION FUNDS: None

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None

J. (U) TEST AND EVALUATION: None

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603254N **BUDGET ACTIVITY:** 4-Tactical Programs
PROGRAM ELEMENT TITLE: Acoustic Search Sensors (Adv)
PROJECT NUMBER: W1292 **PROJECT TITLE:** Advanced ASW Sensors & Processors

A. (U) RESOURCES (Dollars in thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W1292	Advanced ASW Sensors & Processors	10,678	11,184	9,831	10,629	CONT.	CONT.

B. (U) DESCRIPTION: This program provides improved air ASW warfare platform effectiveness through development of advanced hardware and software associated with airborne acoustic systems, including sensors, processing, post- processing, data recording and display capabilities to meet the deeper diving, faster and quieter Soviet submarine threat of the 1990's. Techniques to address the emerging third world diesel threat and operations in bottom limited environments will be addressed as well. Key objectives are platform accommodations of advanced active and passive sensors, improved detection, classification, localization, tracking, counter-counter measures, and increased capacity and flexibility to handle multi-sensor data loads.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

a. (U) Enhanced Tactical Surveillance Sonobuoy (ETSS) - Initiated functional design for sonobuoy software and hardware.

b. (U) Air Deployed Active Receiver (ADAR) - Completed systems studies and at sea data collection.

c. (U) Advanced Active Sonobuoy (AAS) - Completed Development Option Paper (DOP) analysis. Consolidated Counter-counter measures (CCM) studies.

d. (U) Air Active Adjunct (AAA) - Initiated system concept studies.

e. (U) Acoustic Intercept System (AIS) - Transitioned to FSED

2. (U) FY 1991 Program:

a. (U) ETSS - Complete functional design trade-offs.

b. (U) AAS - Award advanced development model (ADM) contract.

c. (U) AAA - Complete DOP analysis. Initiate ADM procurement for selected candidate.

d. (U) ADAR - Complete effort started in FY 1990 and transition to FSED.

e. (U) TAS - Participate in FY 1991 ICEX. Reduce data from FY 1990 ICEX.

3. (U) FY 1992 Plans:

a. (U) ETSS - Initiate Demonstration/Validation (DEM/VAL) tests.

b. (U) AAS - Conduct DEM/VAL tests, evaluate CCM enhancements and initiate software/hardware functional design.

c. (U) AAA - Award contract.

PROGRAM ELEMENT: 0603254N BUDGET ACTIVITY: 4-Tactical Programs
PROGRAM ELEMENT TITLE: Acoustic Search Sensors (Adv)
PROJECT NUMBER: W1292 PROJECT TITLE: Advanced ASW Sensors & Processors

4. (U) FY 1993 Plans:
   a. (U) AAS - Complete system level design and transition to FSED.
   b. (U) AAA - Initiate DEM/VAL tests.
   c. (U) ETSS - Transition to FSED

5. (U) Program to Completion:
   a. (U) This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NADC, Warminster, PA; NWSC, Crane, IN., NAC Indianapolis, IN; NCSC, Panama City, FL; NATC, Patuxent River, MD. CONTRACTORS: None.

E. (U) COMPARISON WITH 1991 PRESIDENT'S BUDGET:
1. (U) Technology Changes: None.
2. (U) Schedule Changes: ETSS transition to FSED delayed from FY 1991 to FY 1993. AAS DEM/VAL tests delayed from FY 1991 to FY 1992.
3. (U) Cost Changes: N/A

F. (U) PROGRAM DOCUMENTATION:

ETSS	OR	2/86	ADAR	OR	11/85
AAA	TOR	4/87			
AAS	TOR	5/86	ADAR	PCAD	2/89

G. (U) RELATED ACTIVITIES:
PE 0604261N, Acoustic Search Sensors (Engineering Development)

H. (U) OTHER APPROPRIATION FUNDS: Not Applicable

I. (U) INTERNATIONAL COOPERATIVE AGREEMENT: None

J. ( ) MILESTONE SCHEDULE:

	MS II
ADAR	2Q/92
ETSS	4Q/92
AAS	4Q/93
AAA	4Q/94

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603260N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Airborne Mine Countermeasures

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0528	Advanced Airborne Mine Countermeasures Equipment	4,359	2,131	1,442	1,184	-0-	22,886
W0529	Airborne Minehunting System	8,204	14,630	8,160	11,206	Cont.	Cont.
TOTAL		12,563	16,761	9,602	12,390	Cont.	Cont.

B. ( ) DESCRIPTION: This program develops airborne mine countermeasures systems that are required to counter known and projected mine threats. Provides a

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603260N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: AIRBORNE MINE COUNTERMEASURES
PROJECT NUMBER: W0528
PROJECT TITLE: ADVANCED AIRBORNE MINE COUNTERMEASURES EQUIPMENT

C. ( ) DESCRIPTION: The rapid speed of forward deployment and effectiveness of helicopter minesweeping has been proven in Haiphong, Suez, the Red Sea, and Persian Gulf. This led to a requirement to expand helicopter mine countermeasures that encompasses a deeper and more effective capability to sweep mines. Systems being developed include: AN/ALQ-166 Magnetic Sweep to sweep magnetic mines and the A/N37U-1 Controlled Depth Moored Sweep.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:
1. (U) FY 1990 Accomplishments:
a. (U) AN/ALQ-166 - Project suspended.
b. (U) A/N37U-1 - Conduct initial operational testing.
2. (U) FY 1991 Program: A/N37U-1 - Award contract for additional systems for technical and operational evaluation.
3. (U) FY 1992 Plans: A/N37U-1 - Complete fabrication and initiate testing of engineering development models.
4. (U) FY 1993 Plans: A/N37U-1 - Complete technical and operational evaluations and obtain AFRP.
5. (U) Program to Completion: Not applicable, program completes in FY93

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVCOASTSYSCEN, Panama City, FL and DTRCEN, Bethesda, MD. CONTRACTORS: to be determined.

F. (U) RELATED ACTIVITIES:
- Cable fairing and towed body technologies developed under PE 0602315N, Mine and Special Warfare
- PE 0603502N, Surface MCM: SSDS

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT						
OPN #193 (BA 3)	6,388	-0-	-0-		Cont.	Cont.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603260N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AIRBORNE MINE COUNTERMEASURES
PROJECT NUMBER: W0529
PROJECT TITLE: AIRBORNE MINE HUNTING SYSTEM

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0529	AIRBORNE MINE HUNTING SYSTEM	8,204	14,630	8,160	11,206	Cont.	Cont.

B. ( ) DESCRIPTION: This project includes sonars for mine detection and classification, and systems for mine neutralization by explosive charge, with equipment designed to provide

Systems being developed: Acoustic Tracking Device and Neutralization System to and AN/AQS-20 Sonar Mine Detecting Set for

PROGRAM ELEMENT: 0603260N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: AIRBORNE MINE COUNTERMEASURES
PROJECT NUMBER: W0529
PROJECT TITLE: AIRBORNE MINE HUNTING SYSTEM

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

a. (U) Neutralization - Conduct explosive effectiveness tests.
b. (U) AN/AQS-20 - Conduct critical component tests. Release draft specification for industry comments/recommendations.

2. (U) FY 1991 Program:
a. (U) Neutralization - Correct vehicle software and initiate technical evaluation.
b. AN/AQS-20 - Conduct developmental and selected operational type testing and obtain Milestone II. Award full-scale engineering development contract.

3. (U) FY 1992 Plans:
a. Neutralization - Perform technical evaluation and document results for future use.
b. AN/AQS-20 - Continue full scale engineering development design and installation. Order long lead items. Test highest risk subsystems.

4. (U) FY 1993 Plans: AN/AQS-20 - Initiate fabrication of engineering development models.

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVCOASTSYSCEN, Panama City, FL; DTRCEN, Bethesda, MD; NSWC DET, Silver Spring, MD; and NAC, Indianapolis, IN. CONTRACTORS: EDO Electro-Acoustic Division, Salt Lake City, UT.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
1. (U) Technology Changes: None
2. (U) Schedule Changes: None
3. (u) Cost Changes: None

PROGRAM ELEMENT: 0603260N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: AIRBORNE MINE COUNTERMEASURES
PROJECT NUMBER: W0529
PROJECT TITLE: AIRBORNE MINE HUNTING SYSTEM

F. (U) PROGRAM DOCUMENTATION:
1. (U) NEUTRALIZATION
NDCP 4/80
TEMP #053-2 (Document in Review)
PCAD 6/86
2. (U) AN/AQS-20
Program Definition Document 4/86
TEMP #053-3 (Document in Review)

G. (U) RELATED ACTIVITIES:
- o Computer-aided detection/classification, cable fairing, and towed body technologies developed under PE 0602315N, Mine and Special Warfare.
- o PE 0603502N, Surface Mine Countermeasures: Advanced Minehunting System, Project S0260
- o PE 0603502N, Surface Mine Countermeasures: Neutralization, Project S1404

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT						
OPN #193 (BA 3)	-0-	-0-	-0-	-0-	Cont.	Cont.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable

J. (U) MILESTONE SCHEDULE:

1.	(U) NEUTRALIZATION	
a.	(U) Complete DT/OT II	3Q91
b.	(U) Complete technical evaluation	4Q92
2.	(U) AN/AQS-20	
a.	(U) Complete DT/OT I	4Q91
b.	(U) Complete ADV DEV/Milestone II	4Q91
c.	(U) Complete DT/OT II	3Q96
d.	(U) Complete FSED	4Q96
e.	(U) AFRP/Milestone III	1Q97

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603261N Budget Activity: 4
PROGRAM ELEMENT TITLE: TACTICAL AIR RECONNAISSANCE
PROJECT NUMBER: WO534 **PROJECT TITLE:** TACTICAL RECONNAISSANCE SYSTEM

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER		FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMP	TOTAL PROGRAM
WO534	Tactical Reconnaissance System	20,987	28,809	15,574	15,537	Cont	Cont

B. (U) DESCRIPTION: The Tactical Air Reconnaissance Program provides timely and highly credible imagery intelligence. Present systems provide such imagery from manned platforms using film based sensors, necessitating a return to base for film processing. Manned reconnaissance, with Electro-Optical (EO), Infrared (IR) and Synthetic Aperture Radar (SAR) sensors can provide both broad coverage and high resolution imagery at extended ranges via data link in near real time. The USMC RF-4B's were phased out in 1990. A Navy Follow-on Tactical Recce (FOTR) capable aircraft will replace the interim Navy F-14 Tactical Air Reconnaissance Pod System (TARPS). A Navy shipboard readout capability compatible with the Joint Service Imagery Processing System (JSIPS-N) will be used for imagery processing, analysis, and storage.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:

a. (U) Advanced Tactical Air Reconnaissance System (ATARS) Sensors: Completed Preliminary and Critical Design Reviews (PDR, CDR).

b. (U) ATARS Integration into F/A-18D(RC): Completed Preliminary and Critical Design Reviews (PDR, CDR) of sensor integration, aircraft provisions and aircraft mission software.

c. (U) Began development USN JSIPS (JSIPS-N).

d. (U) Continued planning for acquisition and incorporation of clear air "standoff" EO/IR sensor.

e. (U) Continued T&E planning for the USN Follow-On Tactical Reconnaissance (FOTR).

f. (U) Interface wiring for future use between Synthetic Aperture Radar (SAR) mode of APG-65/73 and ATARS is installed in F/A-18.

2. (U) FY 1991 PROGRAM:

a. (U) Continue funding of ATARS USMC/USN options.

b. (U) Initiate development flight test of ATARS EO/IR nose sensors.

c. (U) Initiate acquisition and integration of clear air "standoff" EO/IR sensor into F/A-18D configuration for T&E.

d. (U) Complete design effort and continue development of the JSIPS-N capability.

e. (U) Coordinate Test and Evaluation (T&E) planning for the JSIPS-N capability.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603261N Budget Activity: 4
PROGRAM ELEMENT TITLE: TACTICAL AIR RECONNAISSANCE
PROJECT NUMBER: WO534 PROJECT TITLE: TACTICAL RECONNAISSANCE SYSTEM

3. (U) FY 1992 PLANS:
a. (U) Continue development test (DT) and initiate operational test (OT) of ATARS EO/IR nose sensors and data link.
b. (U) Continue development and integration of clear air "standoff" EO/IR sensor.
c. (U) Initiate Low Rate Initial Production (LRIP) of ATARS sensors.
d. (U) Continue JSIPS-N development. Conduct contractor integration and complete T&E planning for JSIPS-N.
e. (U) Continue planning for the USN FOTR.
f. (U) Initiate training course development, provisioning and site activation for F/A-18D(RC).

4. (U) FY 1993 PLANS:
a. (U) Continue LRIP of ATARS sensors.
b. (U) Continue FOT&E of ATARS EO/IR nose sensors and data link.
c. (U) Continue site activation, training and provisioning efforts for F/A-18D(RC).
d. (U) Initiate support equipment acquisition for F/A-18D(RC) and USN FOTR.
e. (U) Initiate test of clear air "standoff" EO/IR sensor.
f. (U) Continue planning for USN FOTR.
g. (U) Continue JSIPS-N development. Perform DT/OT of JSIPS-N.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRDEVCEN, Warminster, PA; NAVAIRTESTCEN, Patuxent River, MD; NAVWPNCEN, China Lake, CA. CONTRACTORS: Prime for F/A-18C/D(RC) aircraft; McDonnell Aircraft Co., St. Louis, MO; Prime for ATARS EO/IR sensors; Martin Marietta Corp., Orlando, FL; Prime for JSIPS-N; General Dynamics Electronics Division, San Diego, CA and E-Systems, Garland, TX; Prime for "standoff" EO sensor; Loral Fairchild Systems, Syosset, NY.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
1. (U) TECHNOLOGY CHANGES: Not Applicable.
2. (U) SCHEDULE CHANGES: Not Applicable.
3. (U) COST CHANGES: *Congressional reduction of $2.0M from JSIPS-N* program in FY 1991.

F. (U) PROGRAM DOCUMENTATION:
1. (U) DON Recce OR: 6/84
2. (U) USMC F/A-18D(RC) PMP: 9/88
3. (U) F/A-18D(RC) TEMP: 4/90
4. (U) JSIPS-N PMP: 7/90

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603261N Budget Activity: 4
PROGRAM ELEMENT TITLE: Tactical Air Reconnaissance
PROJECT NUMBER: WO534 PROJECT TITLE: Tactical Reconnaissance System

G. (U) **RELATED ACTIVITIES:**

1. **PE0204136N, F/A-18 radar upgrade:** Adds reconnaissance capability to multi-mission aircraft; Adds SAR imagery mode provisions to radar upgrade.
2. **PE0206625M, Joint Service Imagery Processing System:** Receives EO/IR/SAR imagery.
3. **PE0604710F, Tactical Reconnaissance:** Develops common EO/IR sensor suite.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
PROCUREMENT:						
APN-1/P1 #9,10	8,800	15,000	54,774	49,825	Cont.	Cont.
APN-6		3,300	4,501	5,214	0	13,015
OPN (JSIPS-N)					55,100	55,100

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Kuwaiti F/A-18 buy includes Reconnaissance Capable (RC) configuration. Kuwait is planning to acquire clear air "standoff" EO sensor.

J. (U) MILESTONE SCHEDULE:

1.	(U) F/A-18 Basic Ordering Agreement (BOA) Award	Sep 87
2.	(U) ATARS EO/IR Sensor Contract	May 88
3.	(U) F/A-18 ECP 206R2 (Provisions)	May 89
4.	(U) USAF EO-LOROPS Contract	Jan 89
5.	(U) ECP DIWS Contract	Mar 90
6.	(U) F/A-18 ECP 206R3 (Conversion Kit)	May 90
8.	(U) Sensors and AC Provisions CDRs	Jul 90
7.	(U) Navy R&D EO-LOROPS Option	Jan 91
9.	(U) ATARS Full Scale Development (FSD) Delivery	Feb 91
10.	(U) ECP JSIPS Contract	Feb 91
11.	(U) F/A-18 ECP 206R4 (Data Link/EO-LOROPS Pod)	Jul 91
12.	(U) Initiate ATARS EO/IR Flt Test	Aug 91
13.	(U) ATARS Hardware Development Test (DT/OT) Complete	Apr 92
14.	(U) ATARS MS IIIA	Jun 92
15.	(U) Complete Integration of JSIPS TIS and APS DIWS	Feb 93
16.	(U) JSIPS-N DT/OT	Jul 93
17.	(U) JSIPS-N MS IIIA	Sep 93
18.	(U) ATARS Software Fleet Release	Oct 93
19.	(U) ATARS Production System	Dec 93
20.	(U) ATARS Follow-on Test & Evaluation (FOT&E) Complete	Feb 94
21.	(U) JSIPS-N MS IIIB	Sep 95

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603262N **BUDGET ACTIVITY: 4**
PROGRAM ELEMENT TITLE: A/C Survivability and Vulnerability

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMP	TOTAL PRGM
W0591	A/C Sur & Vul	5,057	2,516	4,854	4,634	Cont	Cont
W0592	A/C & Ord. Safety	3,859	3,062	2,901	3,800	Cont	Cont
W1277	FAANTAEL	1,203	1,668	3,243	2,794	Cont	Cont
W1819	CV A/C Fire Suppression Sys	1,816	2,043	1,945	1,873	Cont	Cont
	TOTAL	11,935	9,289	12,943	13,101	Cont	Cont

B. (U) DESCRIPTION: Aircraft Survivability & Vulnerability addresses both the reductions in aircraft susceptibility to enemy and non-combat threats and in aircraft vulnerabilities to conventional, nuclear, chemical, biological, radiological, and directed energy. This program expands the survivability technology base and develops prototype hardware which is required to improve the survivability of Naval aircraft. Aircraft and Ordnance Safety ensures that all munitions carried aboard Navy ships be insensitive to fast cook-off (FCO), slow cook-off (SCO), bullet and Fragment Impact (FI), and sympathetic detonation (SD). The Fleet Aircraft Assessment for Navy Testing and Analysis for electromagnetic pulse (EMP) Limitations (FAANTAEL) assesses the vulnerability of tactical aircraft to damage/upset from electromagnetic pulse (EMP). CV Aircraft Fire Suppression Systems develops improved firefighting systems (FFS) and fire protective measures for aircraft carriers.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603262N **BUDGET ACTIVITY: 4**
PROGRAM ELEMENT TITLE: A/C Survivability and Vulnerability
PROJECT NUMBER: W0591 **PROJECT TITLE: Survivability and Vulnerability**

C. (U) **DESCRIPTION:** This project expands the survivability technology base and develops prototype hardware to improve the survivability of Navy aircraft. This project addresses the likelihood of an aircraft being hit (susceptibility) and the probability of kill if the aircraft is hit (vulnerability). This program has developed prototype hardware for the reduction of vulnerability and susceptibility of Navy aircraft which has been or will be incorporated in production.

D. (U) **PROGRAM ACCOMPLISHMENTS AND PLANS:**

1. (U) FY 1990 Accomplishments:
   a. (U) Completed Phase II of the OUTLAW ZEUS program.
   b. (U) Initiated Phase III of the OUTLAW ZEUS program.
2. (U) FY 1991 Program:
   a. (U) Complete Phase III and initiate and complete Phase IV of OUTLAW ZEUS program.
3. (U) FY 1992 Plans:
   a. (U) Initiate and complete Phase II of the OUTLAW KNIGHT program.
4. (U) FY 1993 Plans:
   a. (U) Initiate and complete Phase III of the OUTLAW KNIGHT program.
   b. (U) Develop vulnerability reduction technology for advance aircraft.
5. (U) Program to Completion: This is a continuing program.

E. (U) **WORK PERFORMED BY:** IN-HOUSE: NAVWPNCEN, China Lake, CA; NAVAIRDEVCEN, Warminster PA; NRL, Washington, D.C.; PMTC, Pt. Mugu, CA. CONTRACTORS: Grumman Aerospace, Bethpage, NY.

F. (U) **RELATED ACTIVITIES:** P.E. 0605132D, Joint Technical Coordinating Group on Aircraft Survivability, supports joint combat survivability development, test and evaluation programs, activities and ensures no duplication of effort between the Services with respect to survivability programs.

G. (U) **OTHER APPROPRIATION FUNDS:** This is a non-acquisition program.

H. (U) **INTERNATIONAL COOPERATIVE AGREEMENTS:** NOT APPLICABLE

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603262N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: A/C Survivability and Vulnerability
PROJECT NUMBER: W0592 PROJECT TITLE: A/C and Ordnance Safety

C. (U) DESCRIPTION: This project transitions technology from Insensitive Munitions Advanced Development (Generic Technology) to Air Weapon Systems to comply with CNO direction that all munitions carried aboard Navy ships be insensitive to fast cook-off (FCO), slow cook-off (SCO), bullet and fragment impact (BI/FI), and sympathetic detonation (SD).

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

a. (U) Conducted feasibility analysis of Preferential Insulation Techniques (PIT) for Advanced Medium Range Air-to-Air Missile (AMRAAM) motors with new liner/insulator.

b. (U) Completed materials analysis on GATOR main fills, indicating replacement necessary. Also, commenced containerization improvement investigations.

c. (U) Eliminated strip laminate technology for HARM motors as not cost effective; continued PIT evaluation.

d. (U) Completed testing/analysis of hardened HARPOON/SLAM container designs.

e. (U) Completed MAVERICK SCO and SD testing

2. (U) FY 1991 Program:

a. (U) Monitor Thermally Initiated Venting System (TIVS) using Thermite, for AMRAAM.

b. (U) Evaluate booster explosive insensitive munitions (IM) performance and model main fill explosive requirements for advanced bomb family (ABF).

c. (U) Support warhead IM tests for advanced rocket system (ARS).

d. (U) Provide IM support to Advanced Air-to-Air Missile (AAAM) and Advanced Interdiction Weapon System (AIWS) baseline designs.

e. (U) Commence penetration performance testing of HELLFIRE Optimized Missile System (HOMS).

f. (U) Support improved rocket motor IM tests for Sidewinder.

g. (U) Initiate submunition explosive IM studies for TLAM-D/BLK III.

3. (U) FY 1992 Plans:

a. (U) Demonstrate IM submunition for TLAM-D/BLK III.

b. (U) Complete advance IM booster for ABF.

c. (U) Demonstrate fuze lead direct initiation of ARS warheads.

d. (U) Support AIWS, ABF & AAAM development programs.

e. (U) Support composite motor case technology for AMRAAM product improvement program.

4. (U) FY 1993 Plans:

a. (U) Demonstrate ABF & AIWS IM designs.

b. (U) Demonstrate AAAM IM design.

c. (U) Support ARS development program.

5. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NWC, China Lake, CA; NSWC, Dahlgren, VA. CONTRACTORS: Advanced Ordnance Technology, Inc., Ft. Washington, MD.

F. (U) RELATED ACTIVITIES: NONE.

G. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

FY 1992 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0603262N Budget Activity: 4
Program Element Title: A/C Survivability and Vulnerability
Project Number: W1277 Project Title: Nuclear Survivability A/C

C. (U) DESCRIPTION: The Fleet Aircraft Assessment for Navy Testing and Analysis for Electromagnetic Pulse (EMP) Limitations (FAANTAEL) assesses the vulnerability of tactical aircraft to damage/upset from EMP. FAANTAEL tests verify aircraft hardness and assess the ability for aircraft to perform their mission in an EMP environment. In response to DOD direction to validate hardness through a cost-effective testing, simulation and analysis, the Navy has developed a full scale, threat testing capability at Naval Air Test Center (NATC), Patuxent River, MD. This project also provides research into fiber optic sensors, digital instrumentation, test pulsar development, and recommended solutions/work arounds to EMP problems.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. (U) Completed A-6E post test analysis.
   b. (U) Conducted a complete assessment of the S-3B.
   c. (U) Initiated P-3C test planning.
   d. (U) Conducted pretest analysis and Path of Entry (POE) definition for E-2C.
   e. (U) Completed first phase upgrade of direct drive system with integration of composite waveform generator.
   f. (U) Conducted feasibility tests on second generation fiber optic probe.
   g. (U) NWC pulsar refurbishment contract placed; site selected.
2. (U) FY 1991 Programs:
   a. (U) Initiate AV-8B pretest analysis and POE definition.
   b. (U) Conduct a complete assessment of the P-3C.
   c. (U) Complete S-3B post test analysis.
   d. (U) Conduct Free Field Test/Post Test Analysis of E-2C.
3. (U) FY 1992 Plans:
   a. (U) Ship and refurbish Proof of Principle (POP) pulsar.
   b. (U) Integrate POP pulsar to Vertical Pulse Dipole antenna.
   c. (U) Complete P-3C post test analysis.
   d. (U) Conduct AV-8B, and EA-6B assessments.
4. (U) FY 1993 Plans:
   a. (U) Conduct AH-1W and CH-53E assessments.
   b. (U) Vertical Polarity Dipole (VPD) integration.
5. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, D. C.; COMNAVAIRLANT, Norfolk, VA; NWC, China Lake, CA; NATC, Patuxent River, MD. CONTRACTORS: Veda, Inc., Lexington Park, MD; EG&G/WASC, Lexington Park, MD; ARC/PSG Inc., Arlington, VA.; D.T. Brown, Bohemia, NY; EMA, Lexington Park, MD.

F. (U) RELATED ACTIVITIES: P.E. 0101402N (Project X0793-01, TACAMO 1VB (MP). P.E. 0603514N (Project S1607, EMPRESS II). U.S. Air Force conducts EMP testing at Air Force Weapons Laboratory (AFWL), Albuquerque, NM.

G. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603262N **BUDGET ACTIVITY: 4**
PROGRAM ELEMENT TITLE: A/C Survivability and Vulnerability
PROJECT NUMBER: W1819 PROJECT TITLE: CV A/C Fire Suppression

C. (U) DESCRIPTION: This project develops improved firefighting systems and fire protective measures for aircraft carriers including assessment of aircraft fire properties, the development of the P-25 fire fighting truck (FFT), and improvements to firefighting agents and delivery systems.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. (U) Developed/Updated TEMP for P-25 FFT.
   b. (U) Wrote and submitted acquisition plan for P-25 FFT for NAVSUP/ASN approval.
   c. (U) Conducted test on improved effectiveness of Aqueous Film Forming Foam (AFFF).
   d. (U) Commenced development of prototype flight deck thermal imaging device.
   e. (U) Commenced development of interactive video firefighting trainer.
2. (U) FY 1991 Program:
   a. (U) Issue request for proposal (RFP) for prototype manufacture of P-25 FFT.
   b. (U) Evaluate proposals for award of contract for P-25 FFT prototypes.
   c. (U) Continue development of flight deck thermal imaging device and video firefighting trainer.
3. (U) FY 1992 Plans:
   a. (U) Award contract for prototype manufacture of P-25 FFT.
   b. (U) Continue development of video firefighting trainer.
   c. (U) Develop decision criteria for deck fire imaging system.
   d. (U) Develop ordnance cooling requirements.
4. (U) FY 1993 Plans:
   a. (U) Begin testing prototype P-25 FFT.
   b. (U) Begin full scale fire test.
   c. (U) Begin development of deck fire imaging system.
   d. (U) Continue development of ordnance cooling requirements.
5. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, DC; NSWC, White Oak, MD; NAEC, Lakehurst, NJ; NWC, China Lake, CA. CONTRACTORS: Not Applicable.

F. (U) RELATED ACTIVITIES: Not Applicable.

G. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603270N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: EW TECHNOLOGY

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S2090	0	0	4,916	6,029	CONT.	CONT.
R2030	12,344	0	0	0	0	12,344
TOTAL	12,344	0	4,916	6,029	CONT.	CONT.

B. ( ) DESCRIPTION:

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603270N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: EW TECHNOLOGY
PROJECT NUMBER: S2090 PROJECT TITLE: COUNTER-WARM

C. ( ) DESCRIPTION:

D. ( ) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENT: Not applicable.
2. (U) FY 1991 PROGRAM: Not applicable.
3. ( ) FY 1992 PLANS:

4. ( ) FY 1993 PLANS:

5. (U) PROGRAM TO COMPLETION: Continuing program.

E. (U) WORK PERFORMED BY: Naval Research Laboratory, Washington, DC; PMTC, Pt Mugu, CA; NWC, China Lake, CA; NSWC, Dahlgren, VA; NATC, Patuxent River, MD; and subsequently selected contractors.

F. (U) RELATED ACTIVITIES: None.

G. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603303N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: ELECTROMAGNETIC RADIATION SOURCE ELIMINATION (ERASE)
PROJECT NUMBER: WO447 PROJECT TITLE: ERASE

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
WO447	ERASE	1,091	5,672	5,091	5,362	CONT.	CONT.

B. (U) DESCRIPTION: The ERASE program is the principal source of anti-radiation missile (ARM) guidance and emitter location technlogy for DOD. The ERASE program assesses the state of threat technology and deployment of operational systems in an effort to keep abreast of the continually changing threat enviroment while pursuing the development of key technology elements.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. (U) Completed major portion of Gimballed Seeker Development.
   b. (U) Assembled major systems components of Passive RF Targeting Systems and began F/A-18 pylon integration.
2. (U) FY 1991 Program:
   a. (U) Complete RF Targeting systems installation and perform chamber tests.
   b. (U) Begin fabrication of Dual-Mode Seekers.
   c. (U) Resume C3DF (low frequencey) direction finding system development.
3. (U) FY 1992 Plans:
   a. (U) Begin flight testing of RF Targeting System and conduct live-fire demo.
   b. (U) Begin preliminary testing of Dual-Mode Seeker.
   c. (U) Complete C3DF (low frequency) direction finding system integration and all lab and field tests.
4. (U) FY 1993 Plans:
   a. (U) Perform flight testing of C3DF system and initiate transition.
   b. (U) Complete RF Targeting system flight tests and transition system to F/A-18.
   c. (U) Complete test and evaluation of Dual Multi-Mode Seeker.
5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NOSC, San Diego, CA; NWC, China Lake, CA. CONTRACTORS: Ford Aerospace, Newport Beach, CA; Raytheon Co., Bedford, MA; Falon, San Diego, CA.

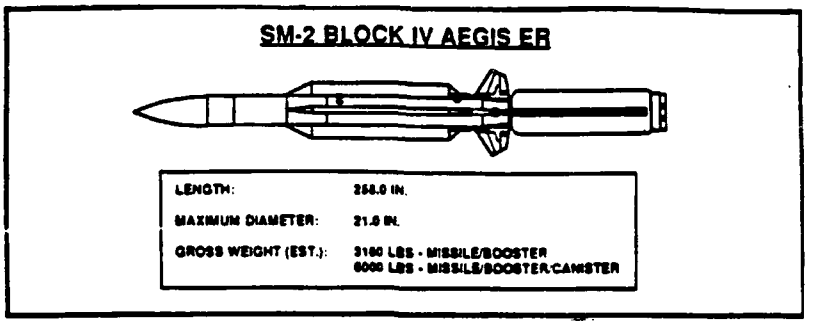
E. (U) RELATED ACTIVITIES: None

F. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: N/A

FY 1992/93 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603318N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AIR TO AIR/SURFACE TO AIR MISSILE
PROJECT NUMBER: S1632 PROJECT TITLE: AEGIS ER (SM-2 BLOCK IV)



A. ( ) SCHEDULE/BUDGET INFORMATION: (DOLLARS IN THOUSANDS)

SCHEDULE	FY90	FY91	FY92	FY93	TO COMPLETE
PROGRAM MILESTONES	AUR REV. DEC	IIIA AUG	IIIB JUNE		HPIRS IOC TBD
ENGINEERING MILESTONES		1ST FLT JAN	PRR FINAL NOV		
T&E MILESTONES					
CONTRACT MILESTONES			FULL PROD. JUN		

BUDGET ($K)	FY90	FY91	FY92	FY93	TO COMP.	TOTAL PROGRAM
MAJOR CONTRACT	78,471	37,745	28,800	14,100	CONT	CONT
SUPPORT CONTRACT	935	100	1,400	1,400	CONT	CONT
IN-HOUSE SUPPORT	11,096	5,662	4,235	3,073	CONT	CONT
GFE/OTHER	260	495	325	50	CONT	CONT
TOTAL	90,762	44,002	34,760	18,623	CONT	CONT

PROGRAM ELEMENT: 0603318N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AIR TO AIR/SURFACE TO AIR MISSILE
PROJECT NUMBER: S1632 PROJECT TITLE: AEGIS ER (SM-2 BLOCK IV)

B. ( ) DESCRIPTION:

The AEGIS ER Missile is the latest member of the STANDARD Missile family of area defense missiles, specifically designed to take maximum advantage of AEGIS and the Vertical Launching System (VLS). This missile, also known as SM-2 Block IV, builds upon the SM-2 Block IIIA baseline with its performance and Adding significant propulsion, guidance, and control enhancements, AEGIS ER extends STANDARD Missile engagement capability to very

The resulting extension of the STANDARD Missile engagement envelope will permit utilization of the The High Performance IR Seeker (HPIRS) development will build upon the ongoing HPIRS advanced development funded for 3 years by the OSD BTI program. HPIRS will provide
This will be most significant against

C. ( ) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. ( ) FY1990 Accomplishments:
   a. ( ) Begin
   b. ( ) Complete
   c. (U) Complete AEGIS Engineering Integration and Test software Preliminary Design Review (PDR).

2. ( ) FY1991 Program:
   a. ( ) Conduct at White Sands Missile Range (WSMR).
   b. ( ) Complete at WSMR.
   c. ( ) Complete
   d. (U) Complete Booster qualification tests for lead contractor. Begin Booster qualification test for follower.
   e. ( ) Complete at WSMR.
   f. ( ) Complete
   g. ( ) Begin
   h. ( ) Award
   i. (U) Complete AEGIS tactical operations prog PDR.

PROGRAM ELEMENT: 0603318N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AIR TO AIR/SURFACE TO AIR MISSILE
PROJECT NUMBER: S1632 PROJECT TITLE: AEGIS ER (SM-2 BLOCK IV)

C. ( ) PROGRAM ACCOMPLISHMENTS AND PLANS (Continued):

3. ( ) FY1992 Plans:
   a. ( )
   b. ( )
   c. (U) Complete MS IIIB 3rd QTR.
   d. ( ) Fabricate for ground tests.

4. ( ) FY1993 Plans:
   a. ( )
   b. ( ) Conduct ground tests of

5. (U) Program to Completion: This is a continuing program

D. (U) WORK PERFORMED BY:

IN-HOUSE: Johns Hopkins University, APL, Laurel, MD; Naval Weapons Center, China Lake, CA; Naval Surface Warfare Center, Dahlgren, VA; Naval Ordnance Station, Indian Head, MD.
CONTRACTORS: Raytheon Company, Bedford, MA; General Dynamics, Pomona, CA; Motorola GEG, Scottsdale, AZ; Allied Signal, Communications Division, Baltimore, MD; G.E. GSD, Moorestown, NJ; Hughes, Canoga Park, CA (HPIRS).

E. (U) COMPARISON WITH FY1991 PRESIDENT'S BUDGET:

1. (U) TECHNICAL CHANGES: Booster TVA and motor case issues resolved. Six successful static firings in OCT/NOV 1990.
2. (U) SCHEDULE CHANGES: Propulsion test vehicle flight test at WSMR planned for JAN-MARCH. GTV at WSMR set for MARCH.
3. (U) COST CHANGES: The FY 1990 budget is increased $1,246K to support the High Performance IR Seeker Program.

F. (U) PROGRAM DOCUMENTATION:

AP 541-86 approved - 21 MAR 87
PEM signed 24 JUN 87
J&A approved 30 APR 87
PMP 87-01 approved - 21 APR 87
TEMP 623-2 approved by ASN 15 NOV 90 and forwarded to OSD.
DCP forwarded to ASN for approval.

G. (U) RELATED ACTIVITIES:

Program Element 0604366N (STANDARD Missile Improvement Program) supports development of SM-2 Block IIIA warhead section to be provided as GFE for SM-2 Block IV round.

PROGRAM ELEMENT: 0603318N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AIR TO AIR/SURFACE TO AIR MISSILE
PROJECT NUMBER: S1632 PROJECT TITLE: AEGIS ER (SM-2 BLOCK IV)

H. (U) OTHER APPROPRIATION FUNDS: (DOLLARS IN THOUSANDS)

WEAPONS PROCUREMENT, NAVY:

	FY90 ACTUAL	FY91 ESTIMATE	FY92 ESTIMATE	FY93 ESTIMATE	TO COMP.	TOTAL PROGRAM
(U) FUNDS	N/A	347,636	191,464	207,380	CONT	CONT
(U) QUANTITY	N/A	300	195	220	CONT	CONT

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NOT APPLICABLE

J. ( ) TEST AND EVALUATION:

Previous results: NONE

FY 1991 Plans:

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603319N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: NATO AAW SYSTEM
PROJECT NUMBER: S1973 PROJECT TITLE: NATO AAW SYSTEM (NAAWS)
POPULAR NAME: NAAWS

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	TO COMPLETE
Program Milestones					
Engineering Milestones					
T&E Milestones					
Contract Milestones					

BUDGET ($K)*	FY 1990	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL TO COMPLETE
Major Contract		0	0	0	3527 ------ 0
Support Contracts	5696	1412	0	0	9038 ------ 0
In-House Support	9186	2119	0	0	17998 ------ 0
GFE/ Other	670	920	0	0	1590 ------ 0
TOTAL	15552	4451	0	0	32153 ------ 0

PROGRAM ELEMENT: 0603319N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: NATO AAW SYSTEM
PROJECT NUMBER: S1973 PROJECT TITLE: NATO AAW SYSTEM (NAAWS)

* U.S. budget only, does not reflect allied contribution (52% through FY 91) to cooperative effort. U.S. budget is shared line including those U.S. unique efforts needed for ship-fit and integration into U.S. ships and to ensure partitioning of sensitive technology.

B. ( ) DESCRIPTION: This cooperative effort captures AEGIS design disciplines in the development of a detect-through-engage Short Range AAW system for frigate size (and larger) ships. System design expressly addresses

replacement for NATO SEASPARROW, the NAAWS system is based on a high frequency, broadband phased array radar to overcome the architectural inadequacy of rotating radar based systems against cruise missiles; and to overcome challenges imposed by environmental and propagation conditions. Forward-looking concepts have been synthesized into a candidate baseline system integrating a suite of dissimilar (RF, IR, ESM) sensors closely coupled and adaptively controlled by a distributed, fiber-optic based architecture. The increased quality of resulting information supports an expanded Threat Evaluation and Weapons Assignment (TEWA) process that coordinates all shipboard hardkill and softkill engagement resources. Principal development items include: a phased array, multi-function radar; a distributed processing system; and a missile that is kinematically optimized for local area/short range engagements. Existing adjunct sensors (e.g., SPS-49, SAR-8, etc.) will be considered for integration during development vice developing new sensors. The two-stage, vertically launched, supersonic missile will feature multi-mode guidance (with IR terminal homing) and backfit potential for use with NATO SEASPARROW Surface Missile System (NSSMS).

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENT:

   a. (U) Restructured program into a block (phased) development following withdrawal of UK and German participation.
   b. (U) Prepared System Specification and Request for Proposal.
   c. (U) Initiated missile guidance risk reduction efforts.

2. (U) FY 1991 PROGRAM:

   a. (U) Completed U.S. Navy Technology Transfer Security Assistance Review Board to authorize required technology disclosure.
   b. (U) Initiate U.S.-unique integration and ship-fit design efforts.
   c. (U) Terminate NAAWS Program.

PROGRAM ELEMENT: 0603319N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: NATO AAW SYSTEM
PROJECT NUMBER: S1973 PROJECT TITLE: NATO AAW SYSTEM (NAAWS)

D. (U) WORKED PERFORMED BY:

1. (U) IN-HOUSE: NSWC/DL, Dahlgren, VA; NRL, Washington, D.C.; NOS/IH, Indian Head, MD; NWC, China Lake, CA; NSWSES, Port Hueuene, CA; NOSC, San Diego, CA.

2. (U) CONTRACTORS: John Hopkins University/Applied Physics Laboratory, Laurel, MD.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) TECHNICAL CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: Program terminated.

3. (U) COST CHANGES: A reduction of $20,293M for FY91 results from the decision to terminate the program by the end of FY91. All funding, FY92 to completion, has been removed.

F. (U) PROGRAM DOCUMENTATION:

TOR	9/86	
JMSNS	9/86	
OR	11/89	
SCP	11/89	(PCAD currently in review)

G. (U) RELATED ACTIVITIES: The following activities are closely coordinated to prevent unnecessary duplication of effort:

- Program Element 0603609N, Conventional Munitions
- Program Element 0604354N, AAM Systems Engineering
- Program Element 0604358N, CIWS (PHALANX)
- Program Element 0604361N, NATO SEA SPARROW
- Program Element 0604369N, 5in Rolling Air Frame Msle
- Program Element 0604508N, Radar Surveillance Equip
- Program Element 0604608N, Surf Electro-Optic Sys

H. (U) OTHER APPROPRIATION FUNDS: Not Applicable

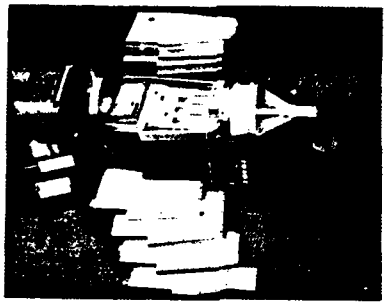
I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS:

- Memorandum of Understanding (MOU) for Concept Exploration Phase: U.S. plus five other participants: Canada, Federal Republic of Germany (FRG), the Netherlands, Spain and United Kingdom. Cost shares: U.S., 47%; others, 10.6% each. Signed, 19 October 1987.(Note: U.K. and FRG effectively terminated their participation in January 1988)

J. (U) TEST AND EVALUATION: Not Applicable

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603320N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: LOW COST ANTIRADIATION SEEKER
PROJECT NUMBER: W1807 PROJECT TITLE: LOW COST SEEKER (LCS)



POPULAR NAME: LCS

A. (U) SCHEDULE/BUDGET INFORMATION: (DOLLARS IN THOUSANDS)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	TO COMPLETE
PROGRAM MILESTONES					
ENGINEERING MILESTONES					
T & E MILESTONES					
CONTRACT MILESTONES	PILOT PRODUCTION (MAR)				

BUDGET ($K)	FY 1990	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL TO COMPLETE
MAJOR CONTRACT	2,878				66,288
SUPPORT CONTRACT	74				1,125
IN-HOUSE SUPPORT	7,603				74,950
GFE/ OTHER	204				388
TOTAL	10,759				142,751

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603320N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: LOW COST ANTIRADIATION SEEKER
PROJECT NUMBER: W1807 PROJECT TITLE: LOW COST SEEKER (LCS)

B. (U) BRIEF DESCRIPTION OF ELEMENT: The HARM weapon system, approved for full production in 1983, provides satisfactory performance against the present threat spectrum. However, in order for HARM to be effective against the newer threat systems that are now being fielded, improvements to HARM's guidance system are needed. HARM Low Cost Seeker (LCS) incorporates new technology which, in addition to improving lethality, will substantially reduce hardware and software complexity resulting greater reliability, enhanced producibility and reduced cost. LCS, initiated to foster competition and expand the ARM industrial base, is a competitor against the upgrade version (Block IV) developed by the missile producer, Texas Instruments, for HARM C production.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:
1. (U) FY 1990 ACCOMPLISHMENTS:
   a. Awarded Pilot Production Option (100 seekers).
2. (U) FY 1991 PROGRAM:
   a. Program terminated.
3. (U) FY 1992 PLANS: Not Applicable.
4. (U) FY 1993 PLANS: Not Applicable.
5. (U) PROGRAM TO COMPLETION: Not Applicable.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVWPNCEN, China Lake, CA; COMPACMISTESTCEN, Pt. Mugu, CA. CONTRACTORS: LORAL Aeronutronics, Newport Beach, CA.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) TECHNICAL CHANGES: None.

2. (U) SCHEDULE CHANGES: Program terminated.

3. (U) COST CHANGES: None.

F. (U) PROGRAM DOCUMENTATION:

NDCP approved in Aug 87
TEMP approved in Nov 88
Acquisition Plan approved in Jan 88

G. (U) RELATED ACTIVITIES: P.E. 0603303N, ERASE; P.E. 0205601N, HARM Improvements Project; Block IV upgrade programs.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603320N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: LOW COST ANTIRADIATION SEKER
PROJECT NUMBER: W1807 PROJECT TITLE: LOW COST SEEKER (LCS)

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Procurement (302227)	8,588*	0	0	0	0	8,588

*Procurement of LCS only

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) TEST AND EVALUATION DATA: See Congressional Data Sheet.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603321N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: ADVANCE AIR-TO-AIR MISSILE
PROJECT NUMBER: W1671 PROJECT TITLE: AAAM

PICTURE NOT AVAILABLE

POPULAR NAME: AAAM

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	TO COMPLETE
Program Milestones	MID D&V REVIEW NOV 90			MS II MAR 93	
Engineering Milestones	GUID. DESIGN	SCTV FAB HWIL			
T&E Milestones		PFRT. CAPTIVE	SCVT FLIGHTS		TECHEVAL MAR 96 OPEVAL MAR 97
Contract Milestones				FSD Mod APR 93	

BUDGET ($K)	FY 1990	FY 1991	FY 1992	FY 1993	Total Program To Complete
Major Contract	58,000	72,486	76,746	88,411	Continuing
Support Contract					
In-House Support	5,309	9,587	10,635	13,534	Continuing
GFE/ Other	5,610	1,638	1,950	2,224	Continuing
TOTAL	68,919	83,711	89,331	104,169	Continuing

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603321 BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: ADVANCE AIR-TO-AIR MISSILE
PROJECT NUMBER: W1671 PROJECT TITLE: AAAM

B. ( ) DESCRIPTION: A primary anti-air warfare mission of Naval TACAIR is protecting carrier battle groups from air-launched anti-ship missiles (ASMs) by the destruction of bombers prior to their weapons release. AAAM will be compatible with F-14, F/A-18, and the next generation of aircraft. kills prior to weapon release will preclude repeated attacks and reduce saturation of area and point defense systems.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

a. (U) Commenced guidance subsystem tests, seeker captive flights and booster firings.

b. (U) Commenced wind tunnel testing.

2. (U) FY 1991 Program:

a. (U) Commence Hardware-in-the-Loop (HWIL) development, fabrication of control test vehicles and aircraft integration. Complete fabrication, integration, and component test of sensors. Construction and test firings of rocket and ramjet motors. Launch of jettison test vehicles (JTVs). Ground launch of separation and control test vehicle (SCTV).

3. (U) FY 1992 Plans:

a. (U) Commence integrated guidance testing (HWIL). Complete fabrication and aircraft integration of SCTVs. Flight test SCTVs. Conduct side-by-side flyover testing of guidance systems.

4. (U) FY 1993 Plans:

a. (U) Complete HWIL testing. Conduct captive flight tests and select one team for FSD contract. Final documentation of studies, analysis test (CDRLs).

5. (U) Program to Completion: This is a continuing program
TECHEVAL MARCH 1996
OPEVAL MARCH 1997

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603321N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: ADVANCED AIR-TO-AIR MISSILE
PROJECT NUMBER: W1671 PROJECT TITLE: AAAM

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRDEVCEN, Warminster, PA; NAVWPCEN, China Lake, CA; PACMISTESCEN, Point Mugu, CA. CONTRACTORS: H&R Company (Hughes/Raytheon),Canoga Park, Ca.; AAAM Joint Venture (General Dynamics/Westinghouse), Pamona, Ca.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET

1. (U) TECHNICAL CHANGES: Not Applicable.

2. (U) SCHEDULE CHANGES: Not Applicable.

3. (U) COST CHANGES: Not Applicable.

F. (U) PROGRAM DOCUMENTATION:

DOP	MAR 86
TEMP	JUL 88
SCP	AUG 88
OR	MAR 87

G. (U) RELATED ACTIVITIES: P.E. 0205667N, F-14 Upgrade; P.E. 0204152N, AEW Aircraft Squadrons.

H. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) TEST AND EVALUATION: Not Applicable.

FY 1992/93 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603382N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: BATTLE GROUP ANTI-AIR WARFARE COORDINATION
PROJECT NUMBER: S0324 **PROJECT TITLE:** BATTLE GROUP ANTI-AIR WARFARE COORDINATION

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0324	BGAAWC	9,083	3,932	11,152	11,301	Cont.	Cont.

B. (U) DESCRIPTION: The Battle Group Anti-Air Warfare Coordination (BGAAWC) Program is an advanced development effort designed to demonstrate Battle Force Anti-Air Warfare (AAW) concepts and capabilities which can significantly improve our Battle Force warfighting capabilities against current and future AAW threats. BGAAWC capitalizes on the superior detection, control, and engage capabilities of the AEGIS Combat System to enhance the AAW warfighting ability of the Battle Force. The program is directed towards developing the Battle Force as a single, distributed AAW weapon system and towards more effective use of tactical data and the cooperative use of Battle Group sensors and weapons, particularly in severe electronic environments. These capabilities will provide the flexibility needed to meet the threat brought about by increasing numbers of highly sophisticated weapons held by potentially hostile countries. BGAAWC defines requirements and develops prototype systems or modifications to existing systems to test new concepts in Battle Force operations. Some examples of prototype systems now in production are Shipboard Gridlock System Automatic Correlation (SGS/AC), AEGIS Display System with color graphics, and Dial-a-Track Link 11 Quality Selection. Near and long term objectives will be phased in to produce higher degrees of battle coordination and effectiveness. (Naval Technical Intelligence Center (NTIC) Threat Assessment #018-88 dated Nov 1988).

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:
   a. (U) Completed design and fabrication of Automatic Identification (Auto-ID) electronics equipment and computer programs for AEGIS ships. Designed Auto-ID system for New Threat Upgrade ships.
   b. (U) Tested Shipboard Gridlock system with Automatic Correlation (SGS/AC) in microprocessors. Recorded and analyzed data for Geodetic Gridlock algorithm verification.
   c. (U) Conducted at-sea tests of 2D gridlock computer programs.
   d. (U) Completed multi-frequency Link 11 equipment and computer programs. Conducted at-sea testing.
   e. (U) Studied Force Threat Evaluation and Weapons Assignment (FTEWA) requirements.
   f. (U) Established and tested candidate and design logic for Remote Data Engage and Remote Data Launch.

PROGRAM ELEMENT: 0603382N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: BATTLE GROUP ANTI-AIR WARFARE COORDINATION
PROJECT NUMBER: S0324 PROJECT TITLE: BATTLE GROUP ANTI-AIR WARFARE COORDINATION

2. (U) FY 1991 PROGRAM:
   a. (U) Complete fabrication of Auto-ID system for at-sea testing in AEGIS ships.
   b. (U) Conduct at-sea testing of SGS/AC. Verify Geodetic Gridlock algorithms in at-sea tests with aircraft.
   c. (U) Analyze multi-frequency Link 11 data and conduct final at-sea demo.
   d. (U) Develop/engineer FTEWA algorithms.
   e. (U) Conduct testing of candidate design logic for Remote Data Engage and Remote Data Launch.

3. (U) FY 1992 PLANS:
   a. (U) Conduct Phase II Auto-ID at-sea experiment in AEGIS cruisers.
   b. (U) Develop definition of multi-sensor tracking process.
   c. (U) Complete lab demo of FTEWA, and Remote Data Exchange and Remote Data Launcher concepts.
   d. (U) Conduct Phase III Auto-ID experiments to integrate Non-Cooperative Target Recognition (NCTR) and Identification Friend or Foe (IFF) tracking concepts.

4. (U) FY 1993 PLANS:
   a. (U) Conduct land-based test site demos of FTEWA, Remote Launch, and Remote Data Engage.
   b. (U) Complete FTEWA, Remote Launch, and Remote Data Engage integration into Cooperative Engagement Capability (CEC).
   c. (U) Complete lab demos of multi-sensor tracking process.
   d. (U) Develop multi-sensor tracking process integration algorithms.
   e. (U) Develop engineering definition of Forward Pass process.

5. (U) PROGRAM TO COMPLETION: This is a continuing program which transitions designs and technology to engineering and production programs.

D. (U) WORK PERFORMED BY: IN-HOUSE: Fleet Analysis Center, Corona, CA; NSWC, Dahlgren, VA; NWSC, Crane, IN; NAC, Indianapolis, IN; NSWSES, Port Hueneme, CA; FCDSSA, Dam Neck, VA; NOSC, San Diego, CA; ECAC, Annapolis, MD. CONTRACTORS: Johns Hopkins University Applied Physics Laboratory (Technical Direction Agent), Laurel, MD; ECI, St. Petersburg, FL; ADTECH, Arlington, VA; SYSCON Corporation, Arlington, VA; VITRO Corporation, Rockville, MD. OTHERS: LOGICON, San Diego, CA; General Physics, Arlington, VA; G.E., Moorestown, NJ.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) Technology Changes: None
2. (U) Schedule Changes: Phase III Auto-ID at-sea demo deferred to FY 1994.
3. (U) Cost Changes: None

PROGRAM ELEMENT: 0603382N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: BATTLE GROUP ANTI-AIR WARFARE COORDINATION
PROJECT NUMBER: S0324 PROJECT TITLE: BATTLE GROUP ANTI-AIR WARFARE COORDINATION

F. (U) PROGRAM DOCUMENTATION:

NAPDD 2/88

G. (U) RELATED ACTIVITIES:

- Program Element 0604303N, AEGIS Area Air Defense, provides for modifications to the AEGIS Weapon System.
- Program Element 0604307N, AEGIS Combat System Engineering, relates to engineering development of the DDG 51 Class and CG 47 Class AEGIS Combat System.
- Program Element 0603318N, AEGIS ER, develops an extended range surface-to-air missile for AEGIS ships with Vertical Launching Systems.
- Program Element 0604518N, CIC Conversion, provides common baseline computer programs for non-AEGIS systems.
- Program Element 0603717N, Command and Control Systems (Advanced), provides for the development of communications links.

H. (U) OTHER APPROPRIATION FUNDS (Dollars in Thousands): Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603451N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: Tactical Space Operations

A. (U) RESOURCES: (Dollars In Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X1845	TADIX-B	1,946	0	0	0	0	10,250
X1846	NTL SYS ENH TACT SUPP	1,422	1,608	2,755	496	376	6,657
X2055	Space Surveillance Development	0	0	1,426	1,410	Cont.	Cont.
	TOTAL	3,368	1,608	4,181	1,906	Cont.	Cont.

B. ( ) DESCRIPTION:

in ocean areas and related coastal zones where U.S. Naval forces may be employed. Tactical support information will provide for battle force management. This program will allow for key allied co-development of spacecraft components through international cooperative cost-sharing. Together, these projects allow the fleet to develop and maintain an essential wide area surveillance capability

PROGRAM ELEMENT: 0603451N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: Tactical Space Operations

PROGRAM NUMBER: X1846 PROJECT TITLE: Slow Walker

C. ( ) DESCRIPTION:

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:
   a. ( )
   b. (U) Conducted SYS-1 Critical Design Review.
   c. (U) Completed Phase IIC upgrade.
2. (U) FY 1991 PROGRAM:
   a. (U) Continue software conversion to Ada.
   b. (U) Begin system integration.
   c. (U) Begin Tactical Ground Station development.
3. (U) FY 1992 PLANS:
   a. (U) Introduce SYS-1 to operational status.
   b. (U) Complete Tactical Ground Station development.
4. (U) FY 1993 PLANS:
   a. (U) Integrate Tactical Ground Station with operational system.
   b. (U) Introduce Tactical Ground Station to operational status.
5. (U) Program To Completion:
   a. (U) Complete full operational capability of Tactical Ground Station.
   b. (U) This program completes in FY 1996.

E. (U) WORKED PERFORMED BY:
IN HOUSE: NAVSPASYSACT, Los Angeles, CA; NAVSWC, Dahlgren, VA.
CONTRACTORS: IBM, Boulder, CO.

F. (U) RELATED ACTIVITIES: Program Element 0102431F, Air Force Defense Support Program.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars In Thousands)
(U) Procurement:

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
OPN	0	0	0	4,500	5,500	10,000

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

PROGRAM ELEMENT: 0603451N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: Tactical Space Operations

PROGRAM NUMBER: X2055 PROJECT TITLE: Space Surveillance Development

C. ( ) DESCRIPTION:

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS: Not applicable.
2. (U) FY 1991 PROGRAM: Not applicable.
3. ( ) FY 1992 PLANS:
   a. (U) Establish New Start.
   b. ( )
   c. (U) Select technologies and initiate cooperative R&D effort.
   d. (U) Establish International Cooperation Development Memorandum of Understanding (MOU) for individual spacecraft components.
4. (U) FY 1993 PLANS:
   a. (U) Continue design of sensor technologies.
5. (U) Program to Completion:
   a. (U) Evaluate selected components as design matures.
   b. (U) Produce prototype components capable of transferability to space-based surveillance programs.
   c. (U) Continue ongoing International Cooperative Project.
   d. (U) Evaluate maturing technologies as to applicability to space-based surveillance programs.
   e. (U) This is a continuing program.

E. (U) WORKED PERFORMED BY: IN HOUSE: Naval Research Lab (NRL), Washington, D.C. CONTRACTORS: NONE

F. (U) RELATED ACTIVITIES: None.

G. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

H. ( )

FY 1992/93 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603502N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Surface Mine Countermeasures

A. (U) **RESOURCES:** (Dollars in thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0260	Minehunt	6,327	6,109	8,751	9,261	Continuing	Cont
S1233	MCM Improvements	7,227	14,676	9,721	9,505	Continuing	Cont
	TOTAL	13,554	20,785	18,472	18,766		

B. ( ) **DESCRIPTION:** The program provides for developments to combat the threat of known and projected foreign mines against U.S. Naval and merchant shipping in harbors, channels, choke points, sea lines of communications, and amphibious and other fleet operating areas. It develops systems and support for systems which will detect, localize, and counter moored, bottom, and [illegible] feet for use in MCM-1 Class, MHC-51 Class, and other surface ships.

PROGRAM ELEMENT: 0603502N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface Mine Countermeasures
PROJECT NUMBER: S0260 PROJECT TITLE: Minehunt

C. ( ) DESCRIPTION: (1) AN/SQQ-32 variable depth minehunting sonar for MCM-1 and MHC-51 ships; (2) and (4) Remotely controlled minehunting vehicles for non-MCM platforms.

D. ( ) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: AN/SQQ-32: Installed EDM in MCM-1; Completed drawings and training material; Extended limited production, and executed options for FY 89/90 ships. Buried Mine Detection: Completed DOP. Remote Minehunting/Rapid Shallow Water Clearance: Completed DOPs.

2. (U) FY 1991 Program: AN/SQQ-32: Extend limited production, complete environmental qualification, competitive contract. Rapid Shallow Water Clearance: Initiate development. Remote Minehunting: Complete requirements documentation. Buried Mine Detection: Complete requirements documentation.

3. (U) FY 1992 Plans: AN/SQQ-32: IOT&E. Prepare for OPEVAL. Rapid Shallow Water Clearance: Continue advanced development. Buried Mine Detection System/Remote Minehunting System: Complete requirements documentation.

4. ( ) FY 1993 Plans: AN/SQQ-32: OPEVAL Production System in MCM-10. Rapid Shallow Water Clearance: Continue advanced development. Buried Mine Detection: Award FSED contracts. Remote Minehunting: Requirements documentation.

5. ( ) Program to Completion: Rapid Shallow Water Clearance: FY 1994 award FSED contract; FY 1995 TECHEVAL; FY 1996 OPEVAL; FY 1998 MS III; Buried Mine Detection: FY 1994 - FY 1995 FSED; FY 1996 OPEVAL, MS III; Remote Minehunting: FY 1994 award FSED contract; FY 1998 OPEVAL, MS III;

E. (U) WORK PERFORMED BY: In-House: NAVCOASTSYSCEN, Panama City, FL and NAVWPNSUPPCEN, Crane, IN. Contractors: Raytheon, Portsmouth, RI; Thomson-Sintra, Brest, France. New start contractors TBD by competition.

F. (U) RELATED ACTIVITIES: PE 0602314N ASW Technology, USMC mine clearance programs and NATO PG26 studies.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT						
SCN #16 (SQQ-32)						
MCM/MHC	4/3	0/3	0/2	0/2		
	87,488	42,135	30,035	31,994	0	269,401
MCM backfit			1	1	6	
OPN #91			11,369	11,851	79,231	102,451
MCM Replacement						
Towed Body		1				
OPN #91		3,828			0	3,828

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

PROGRAM ELEMENT: 0603502N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface Mine Countermeasures
PROJECT NUMBER: S1233 PROJECT TITLE: Mine Countermeasures Improvements

C. (U) DESCRIPTION: (1) AN/SSN-2(V) Precise Integrated Navigation; (2) Modular mechanical Single Ship Deep Sweep (SSDS); (3) Modular Influence Minesweeping; (4) Combat System Trainer (AN/SSQ-94) onboard trainer for MCM and MHC ships; (5) Closed Loop Degaussing to improve survivability of mine countermeasures ships; and (6) Influence Sweep Upgrade to counter future threats.

D. ( ) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: AN/SSN-2(V): Completed software code and test on Phase III system. SSDS: Document preparation. Modular Influence Minesweeping System (MIMS): Pending CNO review.

2. (U) FY 1991 Program: AN/SSN-2(V): Conduct system integration, TECHEVAL, and OPEVAL. SSDS: MS II, award winch engineering development contract. Procure 3 A/N 37U-1 EDM Systems. Combat System Trainer (AN/SSQ-94): Commence development, systems requirement and preliminary design reviews; begin coding.

3. (U) FY 1992 Plans: AN/SSN-2: MS III, contract for Tactical Displays. SSDS: Continue FSED. Combat System Trainer: Development, critical design review. Closed Loop Degaussing System: Transition from Nunn Program, MS II.

4. (U) FY 1993 Plans: AN/SSN-2: Commence deliveries Phase III Systems. SSDS: Conduct DT-IIA/OT-IIA, MS III, award production contract, initiate DT-IIB. Influence sweep upgrade: Prepare requirements documentation.

5. ( ) Program to Completion: AN/SSN-2: Complete deliveries MCM-1-14, SSDS: OT-IIB FY 1994, SSDS Phase II: Requirements documentation FY 1995, MS II FY 1996, FSED contract FY 1996, MS III FY 1998, Closed Loop Degaussing System: OPEVAL FY 1996, MS III FY 1997, Combat System Trainer: Delivery FY 1995. Influence Sweep Upgrade: FY 1994 MS II, development contract, continue development FY 1995-1997, OPEVAL FY 1997, MS III FY 1997,

E. (U) WORK PERFORMED BY: In-House: Naval Coastal Systems Center, Panama City, FL; Naval Weapons Support Center, Crane, IN; Naval Mine Warfare Engineering Activity, Yorktown, VA; Naval Surface Warfare Center, White Oak, Silver Spring, MD. New start contractors TBD by competition contracts.

F. (U) RELATED ACTIVITIES: PE 0603260N, Airborne Mine Counter measures NAVAIR A/N 37U-1 to be adapted for Single Ship Deep Sweep (SSDS).

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT							
SCN #16							
(SSN-2)	9,876	(6)	(6)	(4)			
OPN SSN-2 #91		8,200	8,400	5,600		0	22,200
backfit							
OPN (SSDS) #26			2,079	11,938		5,216	19,233

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NCT programs on AIOS with UK and with France on Crouzet Gradiometer; Signed MOU with France on Closed Loop Degaussing.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603504N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Submarine ASW Development (Advanced)
PROJECT NUMBER: S0223 **PROJECT TITLE:** Submarine Sonar Improvements
A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0223	Submarine Sonar Improvements Advanced	14,936	28,668	31,232	32,535	CONT	CONT

B. (U) DESCRIPTION: This program supports the advanced development and testing of improvements to present and future sonar and combat control systems. The goal is to maintain a clear acoustic and operational superiority over high performance submarine and surface threats, circa 1995-2020, particularly the increasingly quiet and capable Soviet submarines. One-of-a-kind hardware and/or software systems are developed under this program to demonstrate selected and promising exploratory technologies and concepts in an at-sea, submarine environment. Activities in this program include transducers, hull mounted and towed arrays, onboard sonar signal processing, target motion analysis, weapons presets and post-launch control, and multiple contact processing.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

a. (U) HULL ARRAY IMPROVEMENTS. Designed and developed hydrophones required for low frequency hull-mounted arrays and a new very low frequency projector. Developed materials needed to support light-weight Wide Aperture Array (WAA). Completed the Development Options Paper (DOP) for the Very Low Frequency Augmenter (VLFA). Finalized plans for the extended sensor hydrophone design.

b. ( ) TOWED ARRAY IMPROVEMENTS. Analyzed results of and array tests. Developed construction techniques to improve towed array performance while reducing production costs. Designed and developed a Finalized designed for FY91 sea test.

c. (U) HIGH FREQUENCY SONAR. Developed an advanced high frequency sonar for mine detection in poor environments. Program plan and receive array trade off studies completed.

d. ( ) TAP Conducted sea test of Develop capability.

2. (U) FY 1991 Program:

a. (U) HULL ARRAY IMPROVEMENTS. Continue development and testing of hydrophones and sensor materials required for low frequency hull-mounted arrays. Validate inner decoupler performance predictions. Issue Request For Proposal (RFP) for VLFA source.

PROGRAM ELEMENT: 0603504N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Submarine ASW Improvements (Advanced)
PROJECT NUMBER: S0223 PROJECT TITLE: Submarine Sonar Improvements (Advanced)

b. ( ) TOWED ARRAY IMPROVEMENTS. Incorporate new low cost technology into towed array design and construction. Continue design and development. Conduct (surf) and sea tests.

c. (U) HIGH FREQUENCY SONAR. Continue development of an advanced HF Sonar for mine detection in poor environments. Complete system options and provide specifications. Award contract for signal processing control and display.

d. ( ) TAP. Develop an capability. Develop a LFA program for SSN submarines addressing specific technical and tactical requirements.

3. (U) FY 1992 Plans:

a. (U) HULL ARRAY IMPROVEMENT PROGRAM (HAIP). Complete VLFA prototype. Develop and test low frequency sub-array demonstrating acoustic performance and weight reduction improvements.

b. ( ) TOWED ARRAY IMPROVEMENT PROGRAM (TAIP). Develop a submarine Continue and low cost towed array development. Produce towed arrays using low cost array construction technologies.

c. (U) HIGH FREQUENCY SONAR. Continue development and testing of the Advanced Mine Detection Sonar (AMDS) system. Conduct receive array module lake test.

d. ( ) TAP. Continue development of Demonstrate Commence development of an LFA ADM.

4. (U) FY 1993 Plans:

a. (U) HULL ARRAY IMPROVEMENT PROGRAM (HAIP). Refine and transition low frequency material and hydrophone technology to support fully capable Low Cost Planar Array ADM. Conduct projector environmental and reliability tests. Conduct Extended Sensor at sea testing.

b. ( ) TOWED ARRAY IMPROVEMENT PROGRAM (TAIP). Continue and low cost towed array development. Conduct submarine sea test.

c. (U) HIGH FREQUENCY SONAR. Continue development and testing of the Advanced Mine Detection Sonar (AMDS) system. Conduct receive array module sea test.

d. ( ) TAP. Complete development of the capability and continue development of Continue LFA development.

5. (U) Program to Completion: This is a continuing program.

PROGRAM ELEMENT: 0603504N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Submarine ASW Development (Advanced)
PROJECT NUMBER: S0223 PROJECT TITLE: Submarine Sonar Improvements (Advanc

D. (U) WORKED PERFORMED BY: IN-HOUSE: NOSC, San Diego, CA; NUSC, New London, CT, and Newport, RI; NRL, Washington, DC and Orlando, FL.; DTRC Bethesda, MD.; Naval Post Graduate School Monterey, CA.. CONTRACTORS: Analysis & Technology, North Stonington, CT; ARL, University of Texas, Austin, TX.

E. (U) COMPARISON WITH REVISED BY FY 1990/1991 PRESIDENT'S BUDGET:
1. (U) Technology changes: None.
2. (U) Schedule changes: None.
3. (U) Cost changes: None.

F. (U) PROGRAM DOCUMENTATION: NAPDD #237-02, 5/90

G. (U) RELATED ACTIVITIES: PE 0602314N, ASW Technology; PE 0603562N, Project S1739, Submarine Arctic Warfare Development; PE 0604524N, Project S1347, AN/BSY-1 Development; PE 0604524N, Project S1941, AN/BSY-2 Development; and PE 0604503N, Project S0219, Submarine Sonar Improvements (Engineering).

H. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None

J. (U) MILESTONES SCHEDULE:

( )	sea test	2Q/FY91
( )	sea test	2Q/FY91
(U)	Very Low Frequency Augmenter (VLFA) prototype	2Q/FY92
(U)	RANGEX 1-92	2Q/FY92
(U)	Adv Mine Detection receive array sea test	4Q/FY92
(U)	Extended Sensor sea test	3Q/FY93
( )	(sub) sea test	4Q/FY93

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603506N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface Ship Torpedo Defense (SSTD)

A. (U) RESOURCES: (Dollars in thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0225	US National SSTD Program	37,854	35,023	27,321	870	Cont Prog	Cont Prog
S2045	Joint US/UK SSTD Project	11,350	18,011	31,067	33,193	Cont Prog	Cont Prog
TOTAL		49,204	53,034	58,388	35,063	Cont Prog	Cont Prog

B. (U) DESCRIPTION: The Surface Ship Torpedo Defense (SSTD) Program is comprised of the US National SSTD Program and the Joint US/UK SSTD Project:

( ) (S0225) The US National Program will initially provide torpedo defense

Phase I has been expanded to include all NIXIE equipped ships starting in FY 90. Phase II will be expanded to include combatants, combat logistic force (CLF) and selected amphibious ships starting in FY 95.

( ) (S2045) DESCRIPTION: The US/UK Surface Ship Torpedo Defense (SSTD) Joint Project is being designed to counter

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603506N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface Ship Torpedo Defense (SSTD)
PROJECT NUMBER: S0225 PROJECT TITLE: US National SSTD Program
POPULAR NAME: Surface Ship Torpedo Defense (SSTD)

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	To Complete
Program Milestones				*SSTD MSIII* 1 QTR/FY 93	
Engineering Milestones	Detection CDR 8/90	Detec/MOD 7 FCA 4/91	Detec/MOD 7 PCA 4/92		
T&E Milestones		In-Water Tests 6/91	DTII 12/91 OTII 5/92		
Contract Milestones	MOD 7 ORDALT 3/90	EDM DELIV 9/91		SSTD PROD Awards 1 QTR/FY 93	

BUDGET ($K)	FY 1990	FY 1991	FY 1992	FY 1993	Program Total To Complete
Major Contract[1]	19,876	15,513	10,187		
Support Contract	1,482	1,515	1,695	85	
In-House Support	16,351	17,885	15,329	785[3]	
GFE/ Other[2]	145	110	110	0	
TOTAL	37,854	35,023	27,321	870	Continuing

1/ Includes Lab/Field activity contracts previously identified under in-house support.
2/ Includes other support previously identified under in-house support.
3/ Pre-Planned Product Improvements (P^3I) are planned in FY 93.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603506N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface Ship Torpedo Defense (SSTD)
PROJECT NUMBER: S0225 PROJECT TITLE: US National SSTD Program

B. ( ) DESCRIPTION: The US National Surface Ship Torpedo Defense Program will initially provide torpedo defense for _

Phase I has been expanded to include all NIXIE equipped ships starting in FY 90. Phase II will be expanded to include combatants, combat logistic force (CLF) and selected amphibious ships starting in FY 95.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
a. (U) Conducted Critical Design Review (CDR) of the detection subsystem.
b. (U) Fabricated and began component testing of detection subsystem.
c. (U) Began assembly and test of Engineering Development Models (EDM).
d. (U) Began preparation of MS III program documentation requirements.
e. ( ) Continued in-water testing of
f. ( ) Began ORDALT Kit component testing.
g. ( ) Continued development of support equipment.
h. (U) Collected in-water data for detection subsystem.

2. (U) FY 1991 Program:
a. (U) Conduct factory acceptance and environmental testing of detection system EDMs. Deliver EDMs.
b. (U) Install and check out detection EDM on the TECHEVAL ship.
c. ( ) Conduct Environmental, safety, and acceptance testing of the ORDALT Kit.
d. ( ) Integrate ORDALT Kit into the EDMs.
e. ( ) Proof Torpedoes for TECHEVAL.
f. (U) Install and check out launch system aboard the TECHEVAL ship.
g. ( ) Complete development of support equipment.
h. ( ) Conduct Functional Configuration Audit (FCA) of the SSTD Detection, Torpedo, and launch systems.
i. ( ) Conduct preliminary Physical Configuration Audits (PCA) on the SSTD Detection system and Torpedo ORDALT.
j. (U) Conduct the maintenance demonstration of the SSTD system.
k. ( ) Conduct a Production Readiness Review (PRR) on the detection system and Torpedo ORDALT.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603506N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface Ship Torpedo Defense (SSTD)
PROJECT NUMBER: S0225 PROJECT TITLE: US National SSTD Program

3. (U) FY 1992 Plans:
   a. (U) Conduct SSTD TECHEVAL.
   b. (U) Conduct SSTD OPEVAL.
   c. (U) Complete PCA.
   d. (U) Complete Production Readiness Review.
   e. (U) Complete Maintenance Demonstration.
   f. (U) Conduct Logistic Review Audit of the SSTD system.

4. (U) FY 1993 Plans:
   a. (U) Receive Milestone III approval for SSTD system.
   b. (U) Award production contracts.
   c. (U) Commence Pre-Planned Product Improvements.

5. (U) Program to Completion:
   a. (U) Continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: Naval Coastal Systems Center, Panama City, FL; Naval Underwater Systems Center, New London, CT; Naval Sea Combat Systems Engineering Station, Norfolk, VA; Naval Ocean Systems Center, San Diego, CA; Naval Surface Warfare Center, White Oak, MD; Naval Undersea Warfare Engineering Station, Keyport, WA. CONTRACTORS: General Electric, Syracuse, NY; Honeywell, Hopkins, MN; Frequency Engineering Laboratories, Farmingdale, NJ.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
   1. (U) Technical changes: None.
   2. (U) Schedule changes: None.
   3. (U) Cost changes: None.

F. (U) PROGRAM DOCUMENTATION:

OR-S0225	3/85	ASP	7/84	AP 6/89
DCP	1/90	TEMP	1/90	

G. (U) RELATED ACTIVITIES: PE 0603506N, Project S2045, the SSTD US/UK Joint Project.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603506N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface Ship Torpedo Defense (SSTD)
PROJECT NUMBER: S0225 PROJECT TITLE: US National SSTD Program

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT SSTD OPN #67	15,555	23,101	28,657	48,063	Cont Prog	Cont Prog
( ) PROCUREMENT					Cont Prog	Cont Prog

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: A Joint US/UK SSTD Project Memorandum of Understanding (MOU) was signed 26 October 1988. The agreement covers Concept Evaluation (CE), D&V, Full Scale Development and Production with a requirement for national "decisions to proceed" between phases. A Joint Feasibility Study will be conducted in FY 88/89/90 with the United States providing Nunn funding (PE 0603790N, "NATO Cooperative Research and Development") and the United Kingdom providing matching funds. The MOU specifies the cost sharing for the CE and D&V phases.

J. (U) TEST AND EVALUATION:

1. ( ) MOD 7: Since July 1989, approximately 70 in-water test runs have been conducted against modified MK 48 torpedoes simulating
These tests have been conducted from various ships and instrument ranges. Additionally, thousands of simulation runs have been performed at the Naval Coastal Systems Center to verify design modifications to the MOD 7 and simulate encounters. During FY 91, pre-production ORDALT kits will be delivered, proofed and prepared for TECHEVAL. A tactical warhead test is currently being planned for the first quarter of FY 92.

2. ( ) AN/SLR-24: During at-sea towed array noise measurements were made aboard the USS JOHN F KENNEDY. Additional at-sea recordings from a carrier are planned in to provide detection algorithm development data and false alarm rates.

3. (U) CST EX-1: Installation on the TECHEVAL ship is planned for the first quarter of FY 92, with TECHEVAL scheduled to begin in the second quarter of FY 92. CST EX-1 will be staged and tested prior to TECHEVAL at the SEIF at the Naval Coastal Systems Center in Panama City, FL.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603506N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface Ship Torpedo Defense (SSTD)
PROJECT NUMBER: S2045 PROJECT TITLE: US/UK SSTD Joint Project
POPULAR NAME: US/UK SSTD Joint Project

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	To Complete
Program		I 3Q/91		DCP 3Q/93	II 3Q/94
Milestones		EPC I (UK)			IIIA FY 98
Engineering	JFS 3Q/90			Fabricate	Fabricate
Milestones	Complete			ADMs	EDMs FY 96
T&E		Issue		ADM Subsystem	TECH/OPEVAL
Milestones		TEMP 3Q/91		T&E 4Q/93	4Q/97
Contract	Issue 4Q/90	D&V 3Q/91		Issue 4Q/93	FSD Award
Milestones	D&V RFP	Award		FSD RFP	4Q/94

BUDGET($K)	FY1990	FY1991	FY1992	FY1993	Program Total
Major Contract[1]	330	6,825	19,075	20,510	To Complete Cont Prog
Support (NUNN)(278) Contract (R&D)	358	778	1,451	2,213	Cont Prog
In-House Support	10,662	10,263	10,429	10,345	Cont Prog
GFE/ Other	0	145	112	125	Cont Prog
TOTAL	11,350	18,011	31,067	33,193	Cont Prog

B. ( ) DESCRIPTION: The US/UK Surface Ship Torpedo Defense (SSTD) Joint Project is being designed to counter

1/ Includes Lab/Field activity contracts previously identified under in-house support.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603506N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface Ship Torpedo Defense (SSTD)
PROJECT NUMBER: S2045 PROJECT TITLE: US/UK SSTD Joint Project

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. (U) Issued D&V Request for Proposal (RFP).
   b. (U) Issued Common Performance Requirement (CPR).
   c. (U) Initiated Platform Interface requirements.
   d. (U) Initiated definition of National Variants.
   e. (U) Revised/updated Life Cycle Cost (LCC) estimate.
   f. (U) Issued Integrated Logistic Support Plan and Acquisition Plan.
   g. (U) Negotiate FSD cost share.
   h. (U) Received Weapon System Explosive Safety Review approval.
   i. (U) Conducted Logistics Review Group Audit (LRG).
   j. (U) Completed Joint Feasibility Study (JFS).

2. (U) FY 1991 Program:
   a. (U) Complete Concept Evaluation (CE) Phase.
   b. (U) Complete proposal evaluation and award D&V contracts.
   c. (U) Revise system cost estimates.
   d. (U) Complete Logistic Review Group Findings.
   e. (U) Complete Milestone I NPDM.
   f. (U) Begin preliminary SSTD design effort.
   g. ( ) Initiate feasibility testing.
   h. ( ) Continue risk reduction efforts.
   i. (U) Revise CPR.
   j. (U) Approve Test and Evaluation Master Plan (TEMP).
   k. (U) Continue vulnerability internal component damage testing.
   l. ( ) Continue risk reduction testing.
   m. ( ) Initiate signal processing efforts.
   n. ( ) Continue development.
   o. (U) Continue Torpedo Classification algorithm effort.
   p. (U) Conclude FSD Cost-Share negotiations.

3. (U) FY 1992 Plans:
   a. (U) Update POA&M, ILSP and LRFP and Life Cycle Cost estimate.
   b. (U) Complete design of SSTD System Advanced Development Models.
   c. (U) Develop FSD Acquisition Strategy Plan.
   d. (U) Conduct SSTD Design Reviews.
   e. (U) Continue laboratory risk reduction effort.
   f. ( ) Continue development.
   g. (U) Continue Torpedo Classification algorithm effort.
   h. (U) Complete Milestone II WSESRB Review.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603506N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface Ship Torpedo Defense (SSTD)
PROJECT NUMBER: S2045 PROJECT TITLE: US/UK SSTD Joint Project

4. (U) FY 1993 Plans:
   a. (U) Conduct System Effectiveness/Trade-Off Studies.
   b. (U) Develop Integrated Program Summary (IPS)
   c. (U) Update program documentation for Milestone II.
   d. (U) Complete fabrication of and test ADMs.
   e. (U) Complete Milestone II Logistics Review Group Audit.
   f. (U) Initiate identification of TECHEVAL asset requirements.
   g. (U) Conduct System Design Review (SDR).
   h. (U) Finalize FSD specification and issue FSD RFP.

5. (U) Program to Completion: "This is a continuing program."
   a. (U) Complete D&V phase (94) and evaluate FSD proposals.(94)
   b. (U) Complete Milestone II NPDM.
   c. (U) Award FSD contract to single consortium.(94)
   d. (U) Prepare Milestone III documentation. (95-97)
   e. (U) Design Full Scale Development Models.(95/96)
   f. (U) Fabricate Engineering Development/Pre-Production Models.(95/96)
   g. (U) Develop Production Plans.(95/96)
   h. (U) Complete TECHEVAL/OPEVAL.(97)
   i. (U) Complete FSD (97) and complete Milestone IIIA NPDM.(98)
   j. (U) Prepare and issue production RFP.(97)
   k. (U) Award production contract. (98)

D. (U) WORK PERFORMED BY: IN-HOUSE (United States): NAVCOASTSYSCEN, Panama City, FL; NTIC, Wash, DC; NAVOCEANSYSCEN, San Diego, CA; NAVSWC, Silver Spring, MD; NUSC, New London, CT; NUSC, Newport, RI; NAVUSEAWARENGSTA, Keyport, WA; TRICCSMA, Newport, RI; NSCSES, Norfolk, VA. (United Kingdom): ARE Portland, Dorset; ARE Portsdown, Hampshire; Director of Intelligence, London; DGUW(N), Portland, Dorset; ARE Dunfermline, Scotland. CONTRACTORS: APL/UW, Seattle, WA; ARL/PSU, State College, PA. Two of the following three US/UK industry teams to be determined at D&V award: General Electric Co; Martin Marietta, Inc; and Westinghouse Electric Corp. Full list including addresses in Sec.(I).

E. (U) COMPARISON WITH 1991 PRESIDENT'S BUDGET:
   1. (U) Technical changes: None.
   2. (U) Schedule changes: None.
   3. (U) Cost changes: None.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603506N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface Ship Torpedo Defense (SSTD)
PROJECT NUMBER: S2045 PROJECT TITLE: US/UK SSTD Joint Project

F. (U) PROGRAM DOCUMENTATION:

Memorandum of Understanding (MOU)	October 1988
Test and Evaluation Master Plan (TEMP)	July 1990
Common Performance Requirement (CPR)	July 1990
Joint SSTD System Performance Specification	July 1990
Request for Proposal (RFP)	July 1990

G. (U) RELATED ACTIVITIES: PE 0603506N, Project Number S0225, US National SSTD Program is Phases I and II. Project Number S2045 is Phase III.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS:

(U) A US/UK SSTD Joint Project MOU was signed 26 October 1988. The agreement covers CE, D&V, FSD and Production with a requirement for national "decisions to proceed" between phases.

(U) Jointly funded costs will be shared as follows: for CE, the cost of the Joint Project Office (JPO) and its direct support will be shared equally; for D&V, the jointly funded costs will be shared equally; for FSD, the cost of the JPO and its direct support will be shared equally. Cost shares for the FSD contract will be established by the Participants by 4th Quarter 1990.

(U) Fixed price $42.5M D&V contracts will be awarded to one or more consortia in FY 91. The consortia selected will then compete for a single FSED contract in FY 94. At the present time, three industry teams have formed consortia: (1) General Electric Co, Syracuse, NY; Honeywell Inc, Hopkins, MN; Marconi Underwater Sys Ltd, Waterlooville, Hampshire, Eng; Plessey Naval Systems, Templecombe, Somerset, Eng; (2) Westinghouse Elec Corp, Annapolis, MD; AT&T Bell Lab, Whippany, NJ; Librascope Corp, Glendale, CA; Dowty Elec Sys, Greenford, Middlesex, Eng; Ferranti Int Comp Sys, Bracknell, Berkshire, Eng; (3) Martin Marietta, Inc, Baltimore, MD; Hughes Aircraft Co, Buena Park, CA; British Aerospace PLC, Filton, Bristol, Eng; Frequency Engineering Labs, Farmingdale, NJ.

(U) DOD funding profile: NUNN funds FY 87-FY 89; RDT&E funding FY 90-FY 97. There are no financial commitments from industry.

J. (U) TEST AND EVALUATION: Begin D&V subsystem testing 4QTR FY 93.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603508N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: SHIP PROPULSION SYSTEM
PROJECT NUMBER: S1848

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PRGM.
S1848	GAS TURBINE COMPONENT IMPROVEMENT PROGRAM	0	2298	4536	4649	CONT.	CONT.

B. (U) DESCRIPTION: This is not a new start. Total program element was consolidated under Integrated Electric Drive program by FY 90 Appropriation Bill. This project develops Component Improvements, which are not related to Electric Drive, for Navy Surface Ship Gas Turbines to maintain availability, operability and reliability. This project continues the Gas Turbine Component Improvement efforts in their original separate project line.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS: Not Applicable.
2. (U) FY 1991 PROGRAM:
   a. Investigate and correct problems resulting from operational changes such as increased low power operation, power upgrades and use of degraded fuels.
   b. Continue LM2500 in-place balancing development.
   c. Complete efforts in LM2500 fire fighting.
   d. Provide general LM2500, 501 and TF40B support as required.
3. (U) FY 1992 PLANS:
   a. Continue efforts on resolution of problems resulting from operational changes.
   b. Complete LM2500 in place balancing efforts.
   c. Resolve gas turbine technical problems in support of the introduction of AEGIS Class ships.
   d. Provide general LM2500, 501 and TF40B support as required.
4. (U) FY 1993 PLANS:
   a. Continue efforts on resolution of problems resulting from operational changes and introduction of AEGIS Class ships.
   b. Provide general LM2500, 501 and TF40B support as required.
5. PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY:
IN HOUSE: NAVSSES Philadelphia and NSRDC Annapolis
CONTRACTORS: General Electric, Cincinnati, Ohio and Daytona, Fla.; Allison, Indianapolis Ind.; Textron Lycoming, Stratford Conn.; and Westinghouse MTD, Pittsburgh, Penn.

E. (U) RELATED ACTIVITIES: None.
F. (U) OTHER APPROPRIATION FUNDS: None.
G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603512N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: SHIPBOARD AVIATION SYSTEMS

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W1722	CV Weapons Elevator Improvements	1,205	1,022	1,101	1,286	Cont.	Cont.
W1723	CV Launch and Recovery Systems	5,589	7,081	10,339	15,095	Cont.	Cont.
	TOTAL	6,794	8,103	11,440	16,381	Cont.	Cont.

B. (U) DESCRIPTION: This program addresses all technology areas associated with Navy/Marine Corps aircraft operations aboard ships. The program includes: (1) Development of standardized, supportable weapons elevator components; and (2) Development of all systems required to service, support, launch, provide approach and landing control, and recover aircraft operating onto or from ships. Payoffs include increased safety, greater sortie generation rates, enhanced aircraft boarding rates, reduced manning, increased aircraft service life, and force modernization.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603512N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: SHIPBOARD AVIATION SYSTEMS
PROJECT NUMBER: W1722 PROJECT TITLE: CV WEAPONS ELEVATORS IMPROVEMENTS

C. (U) DESCRIPTION: This project provides for the development, test, evaluation and documentation of standardized elevator components such as control systems, doors and hatches, safety devices, platforms and hoist machinery for aircraft carriers. Emphasis will be placed on the improvement of safety, watertight integrity and weight reduction.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
a. (U) Elevator Ballistic Watertight Door (WTD) - Completed candidate designs for fragmentation qualification.
b. (U) Elevator Ballistic Watertight Hatch (WTH) - Initiated design development.
c. (U) Hydraulic Fluid Compression Ignition Test Machine (CITM) -Selected design concept.
d. (U) Tested shipboard prototype flight deck safety barriers.
e. (U) Procured non-asbestos brake material and dynamic brake.
2. (U) FY 1991 Program:
a. (U) Elevator Ballistic WTD - Select final door design and fabricate; conduct flame and hydro tests.
b. (U) Elevator Ballistic WTH - Continue design development.
c. (U) Hyd Fluid CITM - Complete detail design and procure prototype.
d. (U) Conduct elevator brake (non-asbestos) qualification tests. 3. (U) FY 1992 Program:
3. a. (U) Elevator Ballistic WTD - Conduct shock test and install at NAVSSES land based engineering site (LBES).
b. (U) Elevator Ballistic WTH - Procure prototype hatch.
c. (U) Hyd Fluid CITM - test prototype.
d. (U) Non-asbestos brakes - Complete evaluation.
e. (U) Procure and test wire rope test device.
4. (U) FY 1993 Program:
a. (U) Elevator Ballistic WTD - Conduct operability tests. b. (U) Elevator Ballistic WTH - Conduct shock test and install at NAVESSES.
c. (U) Initiate shipboard evaluation of wire rope test device.
d. (U) Design improved undercar mechanical safety subsystem.
5. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVSSES,Port Hueneme, CA; DTNSRDC, Bethesda, MD CONTRACTORS: Rosenblatt, Philadelphia, PA: MTD, Philadelphia, PA: Westinghouse, Pittsburgh PA.

F. (U) RELATED ACTIVITIES: N/A

G. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: N/A

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603512N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: SHIPBOARD AVIATION SYSTEMS
PROJECT NUMBER: W1723 PROJECT TITLE: LAUNCH AND RECOVERY SYSTEMS

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY1991 ESTIMATE	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W1723	CV Launch and Recovery Systems	5,589	7,081	10,339	15,095	Cont.	Cont.

B. (U) DESCRIPTION: This project addresses (1) modernization of catapults and arresting gear, and (2) development of covert air traffic control, approach and landing systems. The first area develops a stand-alone Electromagnetic Aircraft Launch System (EMALS) including associated advanced control and power systems. Also being developed is a control system for arresting gear to replace antiquated, manpower intensive systems of the 1950's. The second area develops electronic and optical tracking, approach, landing and guidance systems for covert all-weather operations on ships. Improved optical landing systems will provide active and passive displays so that the pilot and the Landing Signal Officer (LSO) can take corrective action to prevent accidents and increase boarding rates. The Signature Managed Air Traffic Control, Approach and Landing Systems (SMATCALS) will allow around-the-clock, all-weather operations from ships during radio frequency emission control conditions.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. (U) Continued development of Advanced Development Models (ADM) of Advanced Recovery Control System (ARCS), Improved Carrier Optical Landing System (ICOLS), and Close-in Approach Indicator (CAI) Mod 2.
   b. (U) Awarded 3 EMALS ADM preliminary design contracts.
   c. (U) Completed SMATCALS ADM concept definition studies.
2. (U) FY 1991 Program:
   a. (U) Continue development of ARCS, ICOLS and CAI Mod 2 ADMs.
   b. (U) Issue RFP for SMATCALS ADM.
   c. (U) Complete EMALS ADM preliminary design studies.
3. (U) FY 1992 Plans:
   a. (U) Initiate development of critical EMALS components.
   b. (U) Award SMATCALS ADM contract(s).
   c. (U) Start DEMVALs of ARCS, ICOLS and CAI MOD 2 ADMs.
4. (U) FY 1993 Plans:
   a. (U) Complete DEMVALs of ARCS, ICOLS, and CAI MOD 2 ADMS.
   b. (U) Continue development of critical EMALS components.
   c. (U) Continue development of SMATCALS ADM.
5. (U) Program to Completion: This is a continuing program.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603512N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: SHIPBOARD AVIATION SYSTEMS
PROJECT NUMBER: W1723 **PROJECT TITLE:** LAUNCH AND RECOVERY SYSTEMS

D. (U) **WORK PERFORMED BY:** IN-HOUSE: NAEC, Lakehurst, NJ; NOSC, San Diego, CA; NAC, Indianapolis, IN; NRL, Washington, D.C.; NATC, Patuxent River, MD; NESEA, St. Inigoes, MD. CONTRACTORS: Bell Aerospace, Buffalo, NY; Boeing, Seattle, WA; Hazeltine Corp, Greenlawn, NY.; Kaman Aerospace, Bloomfield, CT; PSM, Pittsburgh, PA; General Atomics, San Diego, CA.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: N/A

2. (U) SCHEDULE CHANGES: None

3. (U) COST CHANGES: None

F. (U) *PROGRAM DOCUMENTATION:*
ARCS -- OR #122-05-88 19 September 86
LSO HUD -- OR# 115-05-88 19 August 86
EMALS -- TOR 09 October 87; DOP 01 May 89;
Acquisition Plan 28 September 89
SMATCALS -- OR # 162-05-90 03 June 87
ICOLS -- OR #195-05-88 28 December 87
CAI MOD 2 -- OR# 172-05-88 06 August 87
LHA PRI-FLY -- OR# 115-05-88 19 August 86

G. (U) OTHER APPROPRIATION FUNDS: N/A at this time.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: N/A

J. (U) *MILESTONE SCHEDULE:*

Subproject Title	MS I	MS II	MS IIIA
ARCS	N/A	93/4Q	98/3Q
LSO HUD	N/A	94/4Q	96/4Q
EMALS	91/3Q	94/4Q	98/4Q
SMATCALS	90/3Q	95/3Q	00/3Q
ICOLS	N/A	93/4Q	97/4Q
CAI MOD 2	N/A		93/3Q

PROGRAM ELEMENT: 0603513N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: SHIPBOARD SYSTEMS COMPONENT DEVELOPMENT

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TOTAL PROGRAM
S0382	Shipboard Auxiliaries Development	0	7,458	24,070	27,337	CONT.
S1712	Hull, Mech. & Elec. Improvement	0	2,500	3,969	3,955	CONT.
	TOTAL	0	9,958	28,039	31,292	CONT.

B. (U) DESCRIPTION: This program develops non-propulsion machinery systems, components and improvements for current and future surface fleet HM&E systems. It includes auxiliary machinery, hull and deck machinery, electric power equipment, ship and machinery controls, fiber optic systems, shipboard corrosion control, HM&E materials, underway replenishment and ship salvage systems. Fiber optics developments include the shipboard cable topology, analog and digital optoelectronic interfaces, passive and active optical sensors, Fiber Optic Data Multiplexing System and combat systems fiber optic development. System developments in the Shipboard Auxiliary Development project are usually ACAT IVT or IVM, and the HM&E Improvement project is Non-ACAT resulting primarily in new specifications, standards and operating procedures. The program uses technology from industry/Navy exploratory development programs, evaluates breadboard units in the laboratory, and develops prototype equipment for technical and operational evaluation in Navy platforms and facilities. Thrusts are directed towards improved performance, affordability, service life, reliability and maintainability, signature reduction, safety, standardization, and reduced life cycle cost, weight, volume, and manning. Systems generally apply to all ships, and many components may be backfitted or implemented relatively late in a new ship design cycle. This presents many windows of opportunity to transition technology to the current and future fleet.

PROGRAM ELEMENT: 0603513N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: SHIPBOARD SYSTEMS COMPONENT DEVELOPMENT
PROJECT NO: S0382 PROJECT TITLE: SHIPBOARD AUXILIARY DEVELOPMENT

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TOTAL PROGRAM
S0382	Shipboard Auxiliaries Development	0	7,458	24,070	27,337	CONT.

B. (U) DESCRIPTION: Develops shipboard auxiliary components and systems to improve performance, reliability, and maintainability and result in size, weight and/or life cycle savings.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Not applicable.

2. (U) FY 1991 Program: (Note: This is not a new start. Total program element was consolidated under Integrated Electric Drive program by FY 90 Appropriation Bill. This project continues essential FY 1989 programs not related to Electric Drive in their original separate project line.)
   a. (U) Resume development of advanced fluid, mechanical, electrical control and power systems and components; HM&E materials and corrosion control, shipboard salvage, hull and deck and underway replenishment technology.
   b. Begin LABEVAL of electrolytic disinfectant generator (EDG), and High-pressure Air Compressor System Components. Begin SHIPEVAL N2 generator, variable capacity centrifugal pump (VCCP); Award contract for 400 HZ current limiting device (CLD), 1st article reverse osmosis unit, E134 refrigerant, R-124 and E-134 impeller designs, and standard family composite pumps. Develop advanced degaussing system technologies. Fabricate and assemble non CFC gas test loop.
   c. (U) Begin development of Combat Systems Fiber Optic Technology and Fiber Optics Data Multiplexing Systems (FODMS).

3. (U) FY 1992 Plans:
   a. (U) Complete LABEVAL and begin SHIPEVAL of EDG, complete SHIPEVAL of N2 generator, shock, and vibration qualification tests of RO unit. Complete evaluation of super saft U.T. inspection system, instrument plate technology for cathodic protection, thermal spray and valve stem repair technology. Begin LABEVAL of 400 HZ CLD and S.S. HPAC air end continue SHIPEVAL of Navy Standard composite pumps and development of advanced degaussing systems.
   b. Continue development of advanced fluid and mechanical, electrical auxiliaries and controls, ships' service power, HME&E materials and corrosion control, hull and deck and ship salvage technology.
   c. (U) Begin development of analog and digital optoelectronic interfaces and passive and active optical sensors. Develop Fiber Optic Data Multiplexing System (FODMS). Continue development of FODMS and combat systems fiber optics systems; develop low level serial interface display, data distribution and video technology capability.

PROGRAM ELEMENT: 0603513N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: SHIPBOARD SYSTEMS COMPONENT DEVELOPMENT
PROJECT NO: S0382 **PROJECT TITLE:** SHIPBOARD AUXILIARY DEVELOPMENT

4. (U) FY 1993 Planned Program:
   a. (U) Continue development of advanced fluid and mechanical, electrical auxiliaries and controls and ships' service power systems, underway replenishment, hull and deck and shipboard salvage systems and plans.
   b. (U) Continue material technology development of, coatings, engineering systems, thermal sprays for machinery restoration, and ship corrosion protection.
   c. (U) Continue development of shipboard fiber optic cable topology, analog and digital optoelectronic interfaces, and begin development of passive and active optical sensors. Continue development of FODMS and combat system fiber optic technology.

5. (U) Program to completion - this is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: DTRC, Bethesda, MD; NAVSSES, Philadelphia, PA; NAVCEL, Port Hueneme, CA; NORDL, St. Louis , MS; NRL, Washington, DC; CONTRACTORS: Dresser-Rand, Painted Post, NY; York Engineering, York, PA; Westinghouse, Marine Technical Div. and R&D Center, Pittsburgh, PA; Risberg Power Electronics, Milwaukee, WI.

E. (U) COMPARISON WITH FY 1991 PRESIDENTS BUDGET: (Note: As indicated above, program was not executed under this project in FY 1990, therefore the FY 1992 comparison will be made to the FY 1989 budget and program.)

1. (U) Technology Changes: None

2. (U) Schedule Changes: None

3. (U) Cost Changes: None

PROGRAM ELEMENT: 0603513N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: SHIPBOARD SYSTEMS COMPONENT DEVELOPMENT
PROJECT NO: S0382 PROJECT TITLE: SHIPBOARD AUXILIARY DEVELOPMENT

F. (U) PROGRAM DOCUMENTATION:

OR	S0382 OF 3 AUG 87	Gaseous Nitrogen Generator
OR	S0382-31 of 22 Sep 88	400 Hz Current Limiting Device
NAPDD	S0382-27 of 10 Nov 86	Shipboard Elec Sys Group Fault Locator
NAPDD	S0382-18 of 23 Jun 86	Shipboard Corrosion Control
TEMP	485-3 of 10 Feb 86	VCCP Fire Pump
TEMP	718-1 of 7 Mar 86	H.P. Single Screw Air Compressor
TEMP	485-01 of 25 Apr 86	Balanced Rotor Vane Pump
TEMP	106-5 of 13 Jun 86	Standard Family of Composite Pumps
TEMP	1156-01 of 7 Oct 88	Shipboard Salvage
NAPDD	241-03 of 4 Jun 90	Shipboard Fiber Optics Topology Development

G. (U) RELATED ACTIVITIES: Program Element 0602121N, Surf. Ship Technology.

H. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

I. (U) International Cooperative Agreement: None

J. (U) MILESTONE SCHEDULE: Category IIIA (AFP) milestones for the following programs are as follows:

VCCP Fire Pump	94/2Q
High Pressure Single Screw Compressor	96/4Q
Standard Rotary Pump	96/2Q
Standard Family of Composite Pumps	95/3Q
Shipboard Salvage System	94/4Q
Gaseous Nitrogen Generator	93/2Q
400 Hz Current Limiter	95/1Q
Shipboard Corrosion Control	Various
Fiber Optics	Various

PROGRAM ELEMENT: 0603513N **BUDGET ACTIVITY: 4**
PROGRAM ELEMENT TITLE: SHIPBOARD SYSTEMS COMPONENT DEVELOPMENT
PROJECT NO: S1712 **PROJECT TITLE: HULL MECH & ELEC IMPROVEMENT**

C. (U) **DESCRIPTION:** This project develops improved equipments which are small but critical components of hull, mechanical and electrical systems with the emphasis on short-term developments for immediate fleet applications.

D. (U) **PROGRAM ACCOMPLISHMENTS AND PLANS:**

1. (U) FY 1990 Accomplishments: Not applicable.

2. (U) FY 1991 Program: Not applicable.

3. (U) FY 1992 Planned Program: (Note: This is not a new start. Total program funding was consolidated under Integrated Electric Drive program by FY 90 Appropriation Bill. This project continues essential FY 1989 programs not related to Electric Drive in their original separate project line.,
   a. (U) Resume/continue development of HP and LP air dehydrators cooling coils, fans, HVAC and electrical equipments composite piping, ducting and components, electrical ship control equipment, Fueling-at-Sea hose/winches, advanced sea and fresh water components, UNREP equipment, material handling equipment, and hull and deck machinery.

4. (U) FY 1993 Plans: Continue development of air system components, composite components and equipment, electrical control equipment, FAS hose/winches, advanced sea and fresh water, ventilation, UNREP, material handling equipment, hull and deck machinery, and advanced HM&E components to meet near term fleet needs.

5. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: DTRC, Bethesda, MD; NAVSSES, Philadelphia, PA; NSWC, Crane, IN; NSWSES, Port Hueneme, CA; NCSC, Panama City, FL; CONTRACTORS: TBD by competitive award.

F. (U) RELATED ACTIVITIES: Program Element 0602121N (Surface Ship Technology).

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603514N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Combat Survivability

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY1991 ESTIMATE	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0384	Ship Survivability (Advanced)	12,836	16,659	10,940	8,625	Cont.	Cont.
S1121	Personnel Protection	4,334	4,479	4,215	3,832	Cont.	Cont.
S1565	Ship Damage Control	7,079	8,207	7,186	7,706	Cont.	Cont.
S1607	EMPRESS II	6,246	0	0	0	0	40,317
S2053	CBR Defense	1,943	1,448	3,248	3,328	Cont.	Cont.
TOTAL		32,438	30,793	25,589	23,491	Cont.	Cont.

B. (U) DESCRIPTION: The advanced development of equipment/systems/engineering data and full scale weapons effects simulation will provide protection of ships and their personnel from conventional, nuclear, chemical, and biological weapon effects, and enable the ship to continue performing assigned missions at an effective level. This program is also concerned with the effects of fire, smoke, and lethal environments created by peacetime accidents and the development of fire protection and damage control capabilities necessary to limit, control, and correct wartime and peacetime casualty situations.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603514N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Combat Survivability
PROJECT NUMBER: S0384 PROJECT TITLE: Ship Survivability (Advanced)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY1990 ACTUAL	FY1991 ESTIMATE	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0384	Ship Survivability (Advanced)	12,836	16,659	10,940	8,625	Cont.	Cont.

B. ( ) DESCRIPTION: This project undertakes developments to meet the objectives of OPNAVINST 9070.1 (Survivability Policy for Surface Ships of the U.S. Navy) and the OP-03K SOCS (Ship Operational Characteristics of the Surface Combatant of the Year 2010) report. Specifically, that (a) warships be capable of sustained combat operations following weapons impact; (b) aircraft carriers and Battle Force surface combatants be able to deal with the broad degrading effects of damage from anti-ship cruise missiles, torpedoes and mines; (c) damaged ship be capable of emptying its magazines for the use of others in support of an ongoing tactical engagement; and (d) ships should have inherent tolerance against blast fragmentation, shock, flooding, fire and smoke, and (e) be capable of performing critical missions in a nuclear conflict.

Initiatives that address the objectives include: lightweight structural composite for topside ship structures (35% - 45% topside weight reduction, increased ballistic protection for the same structural weight, and inherent fire containment);

hull survival against proximity mine/torpedo explosions; uninterruptible combat systems power under battle damage conditions; damage tolerance assessment methods which ensure that survivability principles for Hull Machinery and Electrical (HM&E)/Combat System configurations are designed in the ship design; capability to remotely launch and control remaining VLS missiles from an out-of-action ship in support of battle force operations;

virtually non-combustible cables and cable penetration systems capable of withstanding 2000 degree Fahrenheit temperatures for at least 1 hour; development of structural design capability and assessment of operational capability for ships subjected to ice impact loading; techniques for the removal/prevention of accreted topside ice; and development of technology to reduce the vulnerability of systems and equipment on Navy ships to nuclear weapon effects damage mechanism.

C. ( ) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. ( ) FY 1990 Accomplishments:

a. (U) Conducted EMX, ballistic, and fire screening evaluations on composite structures.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603514 **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Ship Combat Survivability
PROJECT NUMBER: S0384 **PROJECT TITLE:** Ship Survivability (Advanced)

b. ( )

c. (

d. (U) Initiated Dynamic Armor scaled power tests.

e. (U) Completed Computer Aided Design of Survivable Distributive Systems (CADSDiS) model demo of all systems supporting Combat and Mobility Mission areas.

f. (U) Determined ship impact from incorporation of Offboard Command Casualty Launch (OCCL) capability.

g. (U) Conducted study on effects of simultaneous, multiple electrical faults on vital power quality and combat systems operability.

h. (U) Identified alternative full scale validation test methodologies.

i. (U) Developed improved MIL-C-17F shipboard electrical cables.

j. (U) Developed long life hydrophobic coatings formulations.

k. (U) Evaluated Electro-Expulsive Deicer (EED) technology.

l. (U) Conducted localized ice impact load tests on ship hull structural models.

m. (U) Precursor Ship Electromagnetic Pulse (EMP) Trial successfully completed July 1990.

2. ( ) FY 1991 Program

a. ( )

b. (U) Complete DDG-51 composite CIWS maintenance enclosure SHIPSPEC modification and contract guidance drawings.

c. (U) Complete technical assessment of UNDEX whipping resistant hull girder hardening concepts.

d. (U) Complete OCCL design for the DDG-51 Class Vertical Launch System.

e. (

f. (U) Finalize HM&E/Combat System Power Interface Design Data Standard.

g. (U) Complete Electronic power supply preliminary model spec.

h. (U) Develop Multiple Cable Penetrator (MCP) blast tolerant design.

i. (U) Complete MIL-SPEC mods and installation procedures for fire resistant stuffing tube packing materials for cables.

j. (U) Conduct towing tank studies on "battle-damaged" DDG 963 and DDG-51 (Flight I) ship models.

k. (U) Test and finalize long life hydrophobic coatings formulations.

l. (U) Conduct full scale cold weather T&E for UNREP station ice removal equipment.

m. (U) Complete post Precursor ship trial evaluations.

n. (U) Develop ordnance EMP test procedures for full threat ship trial.

3. (U) FY 1992 Plans:

a. ( );

b. (U) Complete uninterruptible electronic power supply demonstration.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603514N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Combat Survivability
PROJECT NUMBER: S0384 **PROJECT TITLE:** Ship Survivability (Advanced)

c. (U) Complete UNDEX whipping resistant hull girder design and producibility study.
d. (U) Complete MIL-SPEC mod for 2000oF critical circuit cables.
e. (U) Conduct full threat EMP trial of CG-68.
f. (U) Complete revisions to cable specifications to incorporate new whole cable fire test methods.

4. (U) FY 1993 Plans:
a. (

b. (U) Complete construction of full scale multi-level composite deckhouse module; initiate full scale multi-level deckhouse tests.
c. (U) Complete MIL-SPEC modification for fire hardened RF coaxial cable to eliminate Class B "running fire" hazard.
d. (U) Complete MIL-SPEC mod for electrical cables to incorporate a 50% fuel load reduction.
e. (U) Complete final design for improved MCP performance in fire, watertightness, and blast tolerance.

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: DTRC, Bethesda, MD; DTRC, Annapolis, MD; U.S. Army Combat Systems Test Activity, Aberdeen Proving Grounds, Aberdeen. MD; NSWC, Dahlgren, VA; NSWC, White Oak, MD; NRL, Washington, DC; NCTRF, Natick, MA; NOSC, San Diego, CA. CONTRACTORS: CASDE Corp., Arlington, VA; MAR, Inc., Rockville, MD; EG&G, Rockville, MD; John J. McMullen Associates, Inc., Arlington, VA; Rockwell International, Arlington, VA.

E. (U) COMPARISON WITH REVISED FY 91 PRESIDENT'S BUDGET:
1. (U) TECHNOLOGY CHANGES: None.
2. (U) SCHEDULE CHANGES: Full scale EMP test of an AEGIS ship planned for FY92.
3. (U) COST CHANGES: None.

F. (U) PROGRAM DOCUMENTATION:
1. (U) NAPDD #148-03B of 9 Dec 86, Passive Fire Protection Electrical Cable Initiatives.
2. (U) NAPDD #153-03 of 18 Feb 87, Cold Weather Operations.
3. (U) NAPDD #232-03 of 4 Apr 90, Surface Ship EMP Hardening.
4. (U) NAPDD #234-03 of 30 Mar 90, Ship Seaway Survivability Criteria.
5. (U) NAPDD #240-03 of 19 Jun 90, Conventional Weapons Survivability.

G. (U) RELATED ACTIVITIES: Program Element 0604516N (Ship Survivability)
Program Element 0602233N (Mission Support)

H. (U) OTHER APPROPRIATION FUNDS: Specification changes included in new construction ships (SCN funding).

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE: Not Applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603514N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Combat Survivability
PROJECT NUMBER: S1121 PROJECT TITLE: Personnel Protection

C. (U) DESCRIPTION: Provides for design/development of shipboard personnel protective clothing and equipment to protect ship's complement from the effects of hostile actions and peacetime accidents.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:
1. (U) FY 1990 Accomplishments:
a. (U) Begin production of Auto-Inflator Life Preserver.
b. (U) Complete operational testing for Flak Vest.
c. (U) Tested helmet mounted Thermal Imager prototypes.
2. (U) FY 1991 Program:
a. (U) Begin production of Naval Battle Helmets.
b. (U) Reach Milestone II on Fire Fighter's Breathing Apparatus (FFBA). Reach Milestone III on Naval Flak Vest.
c. (U) Outfit selected ships with Interim NDI LASER protective spectacles.
3. (U) FY 1992 Plans:
a. (U) Conduct FFBA OPEVAL.
b. (U) Begin production of Naval Flak Vests.
c. (U) Begin full scale development of laser eye protection and testing of Special Application FF Helmet with Integral Thermal Imager.
4. (U) FY 1993 Plans:
a. (U) Begin testing of laser eye protection devices.
b. (U) Conduct TECHEVAL and OPEVAL for Special Application FF Helmet with Integral Thermal Imager.
c. (U) Conduct FFBA OPEVAL and Milestone III decision.
5. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, DC; Navy Clothing and Textile Research Facility, Natick, MA; NCSC, Panama City, FL; NAVSSES, Philadelphia, PA; NAMRL, Pensacola, FL. CONTRACTORS: G. Sharpe, Inc., Arlington, VA; American Systems Engineering Corp., Arlington, VA; Weidlinger Associates, New York, NY and Arlington, VA; JJH, Inc., Arlington, VA.

F. (U) RELATED ACTIVITIES: Not Applicable.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)
OPN: COSAL Outfitting

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
TOTAL OPN	12,490	9,490	15,990	16,150	Cont.	Cont.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603514N BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Ship Combat Survivability

PROJECT NUMBER: S1565 PROJECT TITLE: Ship Damage Control

C. (U) DESCRIPTION: This project provides advanced development of improved Damage Control and firefighting equipment, devices, and systems for rapid damage control and recovery for mission retention in a post hit situation.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

a. (U) Completed Development Options Paper for Integrated Shipboard Management System (ISMS).

b. (U) Issued interim guidance to Fleet on combating weapons-induced conflagration size shipboard fires.

c. (U) Evaluated non-developmental safety and survivability items (NDIs) for accelerated introduction into the Fleet.

2. (U) FY 1991 Program:

a. (U) Commence Advanced Development phase for the ISMS.

b. (U) Complete qualification testing of Lightweight Fire Insulation System.

c. (U) Complete full scale fire tests of weapons induced shipboard fires of conflagration size.

d. (U) Complete qualification testing of intumescent paint for aluminum structures.

e. (U) Complete installation of Flooding Casualty Control System (FCCS) on selected FFG-7 class ships.

3. (U) FY 1992 Plans:

a. (U) Complete Advanced Development Tests of the Damage Control Hull Communications System.

b. (U) Complete development of reduced fuel load shipboard mattresses.

c. (U) Complete doctrine and procedures for fighting weapons-induced conflagration-size shipboard fires.

d. (U) Complete fleet operational assessment of FCCS.

4. (U) FY 1993 Plans:

a. (U) Initiate development of firefighting management and structural assessment modules for ISMS.

b. (U) Complete development of superconcentrated Aqueous Film Forming Foam (AFFF).

c. (U) Initiate large scale tests in ex-SHADWELL of fire retardant composite/barrier materials.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, DC; DTRC, Carderock and Annapolis, MD; NSWC, Dahlgren, VA; NOSC, San Diego, CA; NAVSSES, Philadelphia, PA; NWC, China Lake, CA. CONTRACTORS: Applied Research Laboratory, Arlington, VA; Hughes Associates, Inc., Wheaton, MD; SRI International, Menlo Park, CA; J.J. McMullen Associates, Inc., New York, NY; Westinghouse MTD, Pittsburgh, PA; General Electric, Daytona Beach, FL.

F. (U) RELATED ACTIVITIES: Program Element 0604516N - Project S2054 (Damage Control Engineering)

G. (U) OTHER APPROPRIATION FUNDS: Included in above Project S2054 RDDS.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603514N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Ship Combat Survivability
PROJECT NUMBER: S2053 **PROJECT TITLE:** CBR Defense

C. (U) DESCRIPTION: Advanced development of chemical, biological and radiological (CBR) defensive systems required to counter predict new and novel threats in the early 2000 time frame.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

a. (U) Completed initial design/lab tests of vapor microsensor, automatic liquid agent and stand-off CB agent detection systems.

b. (U) Performed design/lab testing of advanced air purification systems, and initiated threat challenge definition studies.

2. (U) FY 1991 Program:

a. (U) Continue design studies/tests of vapor microsensor, automatic liquid agent detector, stand-off detection, and advanced air purification systems.

b. (U) Initiate studies/testing of materials for advanced protective clothing and continue threat challenge studies.

3. (U) FY 1992 Plans:

a. (U) Complete prototype design/testing of automatic liquid detector, stand-off detection, and air purification systems.

b. (U) Transition advanced protective clothing to engineering development, and continue threat challenge studies.

4. (U) FY 1993 Plans:

a. (U) Complete advanced development of microsensors and transition to engineering development. Initiate automatic BW detection system.

5. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, DC; NPRDC, San Diego, CA; NAEC, Lakehurst, NJ; NAVSWC, Dahlgren, VA; DTRC, Annapolis, MD. CONTRACTORS: Nuclear Research Corp., Philadelphia, PA; Solar Turbine, San Diego, CA; Argonne National Laboratories, Chicago, IL.

F. (U) RELATED ACTIVITIES: Program Element 0604506N CW Countermeasures
Program Element 0602233N Mission Support Technology

G. (U) OTHER APPROPRIATION FUNDS: See RDDS for P.E. 0604506N, Project S0410.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

FY 1992 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603522N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Submarine Arctic Warfare Support Equipment Program
PROJECT NUMBER: S0770 **PROJECT TITLE:** Advanced Submarine Surveillance Support Program

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0770	ASSSP	2,488	3,873	5,151	4,204	CONT.	CONT

B. (U) DESCRIPTION: Develop submarine Electronic Support Measures (ESM) technologies which increase submarine operational effectiveness in an increasingly dense and sophisticated electromagnetic environment. Improved threat warning, over-the-horizon targeting support for submarine-launched cruise missiles, and expanded tactical reconnaissance are addressed. Specific efforts include advanced development of ESM block upgrades, radar cross section reduction techniques, improved targeting techniques, and advanced sensor development in the areas of non-imaging infrared, millimeter wave, and laser threat warning.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   - a. (U) Completed AN/BRD-7 bearing display improvement development.
   - b. (U) Tested Integrated ESM Mast (IEM) risk reduction hardware.
2. (U) FY 1991 Program:
   - a. (U) Investigate advanced ESM and DF techniques applicable to the IEM and AN/WLQ-4(V)1 block upgrades.
   - b. (U) Investigate techniques for obtaining monopulse DF through a compact periscope-mounted antenna.
   - c. (U) Investigate innovative Radar Cross-section Reduction (RCSR) techniques and materials.
3. (U) FY 1992 Plans:
   - a. (U) Continue investigation of advanced ESM/DF techniques.
   - b. (U) Complete periscope mounted monopulse DF investigation.
   - c. (U) Continue investigation of innovative RCSR techniques and materials.
   - d. (U) Begin advanced development of components and sensors for detecting, classifying, and locating signals from electro-optical systems and low-probability-of-intercept (LPI) radars and communications systems.
4. (U) FY 1993 Plans:
   - a. (U) Complete investigation of advanced ESM/DF techniques.
   - b. (U) Continue development of electro-optical systems, LPI radars, and communications systems signals exploitation.
   - c. (U) Begin advanced development of an expendable ESM buoy.
   - d. (U) Continue investigation of innovative RCSR techniques.
5. (U) Program to completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NUSC, New London, CT. CONTRACTORS: Raytheon, Goleta, CA; Sanders, Nashua, NH; RADANT, Stow, MA., GEC-Marconi, San Diego, CA.
E. (U) RELATED ACTIVITIES: Program Element 0604515N (Submarine Surveillance Support Program) continues ASSSP projects through FSD.
F. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.
G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603528N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Non-Acoustic Anti-Submarine Warfare
PROJ. NUMBER: X0967 PROJECT TITLE: Non-Acoustic Anti-Submarine Warfare

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X0967	Non-Acoustic ASW	0	13,931	26,197	58,917	CONT.	CONT.

FY 1990 Funding in PE 0603714D

B. ( ) DESCRIPTION: Continuing advances in Soviet submarine technology and _ reduce the effectiveness of the U.S. Anti-Submarine Warfare forces. In addition, Low Intensity Conflict scenarios frequently involve the _ areas. Current ASW forces rely primarily on acoustic technology in the detection and tracking of submarines. This program monitors progress in non-acoustic ASW research and exploratory development areas, _

_ Currently the objective of the (NA-20) effort is to develop a and demonstrate its capability in the fleet environment on the SH-60B helicopter (FY-91 funding in PE 0603714D). Increased funding for in FY-93 is required to develop a more and initiate a system design effort for fixed wing ASW aircraft. The current effort of the (NA-17) is to assess the performance improvements (Spotlight) capability incorporated into the Increased funding for FY-93 is required to develop an system and to conduct a comprehensive assessment of a ASW potential. The current objectives of the (NA-1/16) project is to complete the development of an ystem (Submarine Tactical Sensor System) and a 'sensor system (Clipper Shale). Increased funding for FY-93 is required to develop an advance submarine wake sensor system incorporating both and sensors.

C. ( ) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS: N/A

PROGRAM ELEMENT: 0603528N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Non-Acoustic Anti-Submarine Warfare
PROJ. NUMBER: X0967 PROJECT TITLE: Non-Acoustic Anti-Submarine Warfare

2. ( ) FY 1991 PROGRAM:
a. ( ) Prepare for a fixed site test in conjunction with TSUNAMI program. Participate in US/UK program. Characterize performance improvements in concept.
b. (U) Conduct at-sea tests of the Submarine Tactical Sensor System (STSS) and make design improvements based on results of testing.
3. ( ) FY 1992 PLANS:
a. ( ) Complete fabrication, integration, and initiate at-sea testing of system.
b. ( ) Conduct final at-sea evaluation of STSS in a
c. ( ) Conduct submarine generated test.
d. ( ) Initiate feasibility and utility assessment of for ASW.
e. ( ) Conduct review of concepts for potential ASW utility.
f. ( ) Conduct fixed site test.
4. ( ) FY 1993 PLANS:
a. ( ) Complete at-sea testing of ASW system and effect transition of ASW detection technology to COMNAVAIRSYSCOM as an ACAT III program.
b. ( ) Initiate concept studies and design for high search rate, system.
c. ( ) Collect false alarm data for
d. (U) Conduct at-sea tests with improved Clipper Shale.
e. ( ) Commence development of an advanced ensor system.
f. ( ) Conduct at-sea target testing of advanced concepts.
g. ( ) Initiate preliminary design studies of advanced sensor.
h. ( ) Continue feasibility and utility assessment of for ASW.
i. ( ) Initiate development program for candidate concepts.
5. ( ) PROGRAM TO COMPLETION: This is a continuing program.
a. ( ) Develop and test ASW system.
b. ( ) Initiate acquisition program planning for transition of sensor system to NAVSEASYSCOM.
c. ( ) Complete fabrication and testing of advanced sensors to demonstrate and validate utility projections.
d. ( ) Complete feasibility and utility assessment of for ASW.
e. ( ) Complete development and evaluation of improved sensor capability.

f. (U) Continue to monitor non-acoustic developments for potential ASW utility.

D. (U) WORK PERFORMED BY: IN HOUSE: NRL, Washington, D.C.; NUSC, Newport, RI; NADC, Warminster, PA; NOARL, Stennis Space Center, MS; NOSC, San Diego, CA; NCSC, Panama City, FL; CONTRACTORS: Applied Physics Laboratory/Johns Hopkins University, Laurel, MD; TRW Space Systems, Redondo Beach, CA; Lockheed Sanders Inc., Nashua, NH; ARETE' Associates, Sherman Oaks, CA; Dynamics Technology Inc., Torrance, CA; McDonnell Douglas Electronics Systems Corp., Huntington Beach, CA.E.

E. (U) COMPARISON WITH REVISED FY 1991 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: None.
2. (U) SCHEDULE CHANGES: None.
3. (U) COST CHANGES: None.

F. (U) PROGRAM DOCUMENTATION:

NAPDD #033-095 10 March 1986
TOR Ser 098R/6S357617 22 December 1986

G. ( ) RELATED ACTIVITIES:

H. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

I. ( ) INTERNATIONAL COOPERATIVE AGREEMENTS: Anticipate US/UK Memorandum of Understanding (MOU) for classified work.

J. (U) MILESTONE SCHEDULE:

1. ( ) (NA-1/16)
   a. ( ) SUBMARINE TACTICAL SENSOR SYSTEM APR-JUN 92
   b. (U) IMPROVED CLIPPER SHALE SEA TEST - APR-JUN 93
   c. ( ) ADVANCE SENSOR SYSTEM PRELIMINARY DESIGN REVIEW - SEP 93
2. ( ) (NA-17)
   a. (U) DATA ANALYSIS REPORT - SEP 91
   b. ( ) SUBMARINE TEST - MAY 92
   c. (U) PRELIMINARY UTILITY ASSESSMENT - SEP 93
   d. ( ) PRELIMINARY DESIGN REVIEW FOR ADVANCED - SEP 93
3. ( ) (NA-20)
   a. ( ) SEA TEST - JUN 92-DEC 92
   b. ( ) ACAT DECISION - JUN 93
   c. ( ) CONCEPT ANALYSIS REPORT - SEP 93
   d. ( ) HIGH POWER LASER TECHNICAL REVIEW - OCT 93
4. ( ) (NA-4)
   a. (U) CONCEPT ANALYSIS REPORT - SEP 93
   b. ( ) SENSOR TECHNICAL REVIEW - SEP 94

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603529N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Advanced Anti-Submarine Warfare Target
PROJECT NUMBER: S0968 PROJECT TITLE: Advanced Anti-Submarine Warfare Target

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY1990 ACTUAL	FY1991 ESTIMATE	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0968	Advanced Anti-Submarine Warfare Target	19,832	4,910	17,102	17,329	CONT.	CONT.
S1017	EMATT	3,865	0	0	0		
S1955	Fast Deep R&D TRG	3,893	0	0	0		
TOTAL		27,590	4,910	17,102	17,329	CONT.	CONT.

B. (U) DESCRIPTION: The MK 30 Mod 3 Fast Deep Target is being developed to establish a continuing capability for test & evaluation of the Navy's newest torpedoes. This project is a three phased program. The first phase will use the Target MK40 electro-acoustic payload and the ADSCEPS propulsion system currently under development. The second phase will complete the design of the MK30 based electro-acoustic payload and integrate it with the ADSCEPS propulsion system. The final phase will retrofit the first two vehicles (phase 1) with MK30 payloads.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603529N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Advanced Anti-Submarine Warfare Target
PROJECT NUMBER: S0968 **PROJECT TITLE:** Advanced Anti-Submarine Warfare Target

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY1990 ACTUAL	FY1991 ESTIMATE	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0968	Advanced Anti-Submarine Warfare Target	19,832	4,910	17,102	17,329	CONT.	CONT.

B. (U) DESCRIPTION: The MK 30 Mod 3 Fast Deep Target is being developed to establish a continuing capability for test & evaluation of the Navy's newest torpedoes. This project is a three phased program. The first phase will use the Target MK40 electro-acoustic payload and the ADSCEPS propulsion system currently under development. The second phase will complete the design of the MK30 based electro-acoustic payload and integrate it with the ADSCEPS propulsion system. The final phase will retrofit the first two vehicles (phase 1) with MK30 payloads.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. (U) Complete design of the propulsion system.
   b. (U) Fabricate two MK40 payload and two propulsion systems.
   c. (U) Continue design efforts of the MK30 Mod 2 payload system.

2. (U) FY 1991 Program:
   a. (U) Integrate payload and propulsion systems.
   b. (U) In-water testing of first two vehicles.
   c. (U) Continue design of the MK30 payload.

3. (U) FY 1992 Plans:
   a. (U) Initiate operations at AUTEC in support of torpedo programs.
   b. (U) Complete design of MK30 payload.
   c. (U) Begin system integration of MK30 payload with propulsion system.

4. (U) FY 1993 Plans:
   a. (U) Complete system integration of the MK30 system.
   b. (U) Begin in-water testing of the MK30 payload system.

5. (U) Program to completion:
   a. (U) Complete in-water testing of MK30 system.
   b. (U) Deliver two MK30 vehicles to AUTEC.
   c. (U) Upgrade MK40 based vehicles with MK30 hardware.
   d. (U) This is a continuing program.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603529N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Advanced Anti-Submarine Warfare Target
PROJECT NUMBER: SO968 **PROJECT TITLE:** Advanced Anti-Submarine Warfare Target

D. (U) WORK PERFORMED BY: In-House: Naval Underwater Systems Center, Newport, RI (Lead Laboratory and System Integrator); Naval Undersea Warfare Engineering Station, Keyport WA (Depot and ISEA) Contractors: Loral Systems Group, Akron, OH; Raytheon Corp., Portsmouth, RI; and ARL/Pennsylvania State University, State College, PA.

E. (U) COMPARISON WITH FY1991 PRESIDENT'S BUDGET:
1. (U) Technology Changes: None
2. (U) Schedule Changes: None
3. (U) Cost Changes: None

F. (U) PROGRAM DOCUMENTATION: NAPDD - 10/90

G. (U) RELATED ACTIVITIES: PE 0603691 MK 48 Advanced Capability Engineering, Project Number S0366.

H. (U) OTHER APPROPRIATION FUNDS: Not Applicable

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE:
1. Payload development contract award - 4QTR FY90
2. In-water test & evaluation - FY91
3. First two units operational - 1QTR FY92.
4. Second two units operational - 3QTR FY94.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603542N BUDGET ACTIVITY: 4-Tactical Programs
PROGRAM ELEMENT TITLE: Radiological Controls

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1825	Radiological Controls	184	205	193	205	CONT.	CONT.
S1830	RADIAC Development	3,565	3,835	2,683	3,634	CONT.	CONT.
	TOTAL	3,749	4,040	2,876	3,839	CONT.	CONT.

B. (U) Description: This program coordinates all Navy efforts for the development of nuclear radiation detection devices. This includes hand-held RADIAC meters, personnel dose measurement devices, and area monitors used to measure radiation fields. Present RADIAC instrumentation is based largely on obsolete electronic technology and incurs expensive calibration and maintenance costs. The development of a new generation of microprocessor based instrumentation will cut calibration costs by 75% (resulting in a saving of $5 million per year) and reduce the requirements for spare parts by 85%. The estimated savings to investment ratio of this program is approximately 5 to 1. New requirements for the measurement of lower tritium and neutron levels necessitate the development of modernized instrumentation. The program is critical to joint-service radiation safety initiatives within DOD and has been coordinated with Army, Air Force, and Defense Nuclear Agency personnel to achieve the maximum cross-service applicability. This program also provides required improvements in nuclear weapon intrinsic radiation (gamma and neutron) shielding determinations, in mixed-field (gamma and neutron) dosimetry and in neutron measurement to ensure safety and health of personnel.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603542N **BUDGET ACTIVITY:** 4-Tactical Programs
PROGRAM ELEMENT TITLE: Radiological Controls
PROJECT NUMBER: S1825 **PROJECT TITLE:** Radiological Controls

C. (U) **DESCRIPTION:** This project provides required improvements in nuclear weapon intrinsic radiation (gamma and neutron) shielding determinations, in mixed-field (gamma and neutron) dosimetry and in neutron measurement to ensure safety and health of personnel.

D. (U) **PROGRAM ACCOMPLISHMENTS AND PLANS:**

1. (U) FY 1990 Program: Completed refinements in the computer program that maps radiation levels to simplify and accelerate its operation. Development of methods for using bubble dosimetry techniques for environmental monitoring of neutrons in Navy ships.

2. (U) FY 1991 Program: Continue development of methods for using bubble dosimeter techniques for environmental monitoring of neutrons in Navy ships. Continue to adapt the computer program for mapping radiation levels to make it more suitable for use on a standard Navy microcomputer.

3. (U) FY 1992 Plans: Continue to develop shipboard use of bubble dosimeters for mixed field environmental monitoring and as a possible personnel dosimeter. Improve the computer program for radiation level mapping to include a variety of structural materials and shipboard configurations.

4. (U) FY 1993 Plans: Continue development and fleet implementation of bubble dosimetry as an area monitor and personnel/accident dosimeter. Continue refinement of the computer program for mapping radiation levels and establish it as an available asset for the fleet through database development.

5. (U) Program to Completion: This is a continuing program.

E. (U) **WORK PERFORMED BY:** Naval Surface Warfare Center (NSWC), White Oak Laboratory, Silver Springs, MD; Naval Research Laboratory, Washington, DC; and Naval Sea Systems Command.

F. (U) **RELATED ACTIVITIES:** None.

G. (U) **OTHER APPROPRIATION FUNDS:** None.

H. (U) **INTERNATIONAL COOPERATIVE AGREEMENTS:** None.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603542N BUDGET ACTIVITY: 4-Tactical Programs
PROGRAM ELEMENT TITLE: Radiological Controls
PROJECT NUMBER: S1830 PROJECT TITLE: RADIAC Development

C. (U) Description: Project S1830 involves the development of microprocessor based instrumentation which will consolidate the Navy's RADIAC requirements by using a general purpose display box with a number of calibrated probes instead of buying numerous special purpose instruments. Instrumentation is being developed to meet new requirements for tritium and neutron detection. A laser-heated personnel dosimetry system is being developed to provide better sensitivity and accuracy than current systems.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Award contract for Full Scale Development (FSD) of Laser Heated Thermoluminescent Dosimetry (LHTLD) System. Award contracts for Dem/Val phase of Multifunction RADIAC (MFR) System. Continue Conceptual Phase for Tritium Monitor. Continue Dem/Val Phase for Neutron Dosimetry System (NDS), and Underwater RADIAC.

2. (U) FY 1991 Program: Continue Dem/Val contract for MFR System. Continue FSD contract for LHTLD System. Continue Conceptual Phase for Tritium Monitor.

3. (U) FY 1992 Plans: Award FSD contract for MFR System. Continue FSD contracts for LHTLD System. Continue Conceptual Phase for Tritium Monitor.

4. (U) FY 1993 Plans: Begin Limited Production for MFR System, LHTLD System. Award Dem/Val contract for Tritium Monitor.

5. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NSWC White Oak, Oak Ridge National Labs, Oak Ridge, TN; and Naval Sea Systems Command. CONTRACTORS: Laser Heated Thermoluminescent Dosimetry System work is performed by contractor, IST, Inc. Spokane, WA. Multifunction work is performed by SAIC and Sorrento Electronics. Both contractors are in San Diego, CA.

F. (U) RELATED ACTIVITIES: A Memorandum of Understanding is being circulated within the Air Force for the Multifunction RADIAC System.

G. (U) OTHER APPROPRIATIONS FUNDS: None.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603553N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: SURFACE ANTI-SUBMARINE WARFARE (ASW)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY1990 ACTUAL	FY1991 ESTIMATE	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PRGM
S1704	ASW ADVANCED DEVELOPMENT	35,701	37,137	60,146	64,290	CONT	CONT
S0229	SURFACE SHIP SILENCING	4,670	9,254	7,090	7,731	CONT	CONT
S2032	COAST GUARD SONAR	3,999	0	0	0	0	3,999
TOTAL		44,370	46,391	67,236	72,021	CONT	CONT

B. (U) DESCRIPTION: This program develops surface antisubmarine warfare combat system and surface ship silencing technology. The Surface Ship Silencing Project develops technology to reduce sonar self-noise and radiated noise, particularly at high operating speeds. The ASW Advanced Development Project develops technology for surface ship ASW systems improvements, supporting sea tests for AN/SQY-1, and for multistatic sonar system concepts.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603553N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: SURFACE ANTI-SUBMARINE WARFARE
PROJECT NUMBER: S1704 PROJECT TITLE: ASW ADVANCED DEVELOPMENT

A. (U) RESOURCES (Dollars in Thousand)

PROJECT NUMBER	TITLE	FY1990 ACTUAL	FY1991 ESTIMATE	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGR
S1704	ASW ADVANCED DEVELOPMENT	35,701	37,137	60,146	64,290	CONT	CONT

B. ( ) DESCRIPTION: This project provides for the advanced development and validation of technology for ongoing surface ship ASW system improvement programs and emerging ASW combat systems such as It supports the continuing development of

submarine threat.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:
a. (U) USS Glover at-sea Milestone II demonstration test successfully completed.
b. (U) Competitive FSED proposal evaluation for backfit FFG and BFC systems completed.
c. (U) Reconfigurable Multiline Evaluation System (RMES) at-sea acceptance trial completed successfully.
d. (U) RMES active receiver demonstrated.
e. (U) RMES land based processor installed.
f. (U) Four contractor prototype sonars for Coast Guard evaluated at Seneca Lake and at-sea.
g. (U) Pressurized Test Chamber installed at Seneca Lake.
h. (U) Multistatic Sonar (MSS) active array characterization completed.
i. (U) MSS receive processor Preliminary Design Review (PDR) and Critical Design Review (CDR)'s completed.

2. (U) FY 1991 Program:
a. (U) Conduct evaluation of RMES modifications to support MSS Proof of Principal (POP) sea trial.
b. (U) Conduct MSS POP trials.

PROGRAM ELEMENT: 0603553N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: SURFACE ANTI-SUBMARINE WARFARE
PROJECT NUMBER: S1704 PROJECT TITLE: ASW ADVANCED DEVELOPMENT

c. (U) Initiate development of mid-frequency active classification processor.

d. (U) Initiate development of multistatic Advanced Development Model (ADM) transmitter, transducers, and receive sub-systems.

e. (U) Complete fabrication of GE, Hughes, and TRW multistatic receive processor for USS Glover.

f. (U) Initiate hardware fabrication and complete software development for long-line hydrophone calibrator (LLHC).

g. (U) Conduct development of single and multiple platform combat control algorithms.

h. (U) Initiate analysis of active processing techniques which include orthogonal waveforms, continuous transmit waveforms, and auto-detect/normalization techniques.

3. (U) FY 1992 Plans:

a. (U) Develop low frequency transmitter velocity control techniques.

b. (U) Complete array interaction and cavitation assessments.

c. (U) Initiate Multi-Line Towed Array (MLTA) performance improvements.

d. (U) Complete MSS ADM transducer prototype.

e. (U) Conduct MSS deep duct test and shallow water data gathering sea trials.

f. (U) Initiate clutter reduction and Pseudo Random Noise (PRN) waveform analysis.

g. (U) Complete mid frequency active classification processor.

h. (U) Complete integration of multiplatform data fusion algorithms.

i. (U) Complete fabrication of mechanical system and test enclosure development for the LLHC.

4. (U) FY 1993 Plans:

a. (U) Complete MSS ADM source fabrication.

b. (U) Initiate fabrication of MSS ADM transducers.

c. (U) Complete MSS ADM array fabrication.

d. (U) Conduct MSS CZ and Northern Waters sea trials.

e. (U) Complete PRN waveform analysis effort.

f. (U) Complete CMIDS validation for data fusion algorithm evaluation.

g. (U) Complete test and installation of LLHC mechanical and test enclosure subsystem.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORKED PERFORMED BY: IN-HOUSE: Naval Underwater Systems Center, New London, CT; Naval Ocean Systems Center, San Diego, CA; Naval Research Laboratory, Washington, DC and Orlando, FL.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603553N BUDGET ACTIVITY: 4
.PROGRAM ELEMENT TITLE: SURFACE ANTI-SUBMARINE WARFARE
PROJECT NUMBER: S1704 PROJECT TITLE: ASW ADVANCED DEVELOPMENT

CONTRACTORS: Johns Hopkins University, Laurel, MD; University of Texas, Austin, TX; Martin Marietta, Glen Burnie, MD; SCT Inc., Palo Alto, CA; Orincon .Inc., La Jolla, CA; ESL Inc., Sunnyvale, CA; Hughes Ground Systems, Buena Park, CA; EDO Inc., NYC NY; Raytheon, Portsmouth, RI; Instruments, Inc., Los Angeles, CA.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) Technology changes: None.

2. (U) Schedule changes: None.

3. (U) Cost changes: None.

F. (U) PROGRAM DOCUMENTATION: NAPDD (154-03) 3/87

G. (U) RELATED ACTIVITIES: Program Element 0604713N/S1916 (Surface ASW Systems Improvement; AN/SQQ-89 (Improved)): development of upgrades to the AN/SQQ-89 system to counter recently identified threat improvements, including reductions in radiated noise.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

FY 1992 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603553N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface Anti-Submarine Warfare
PROJECT NUMBER: S0229 PROJECT TITLE Surface Ship Silencing

C. ( ) DESCRIPTION: Surface ship acoustic quieting provides for the development and at-sea demonstration of quieting techniques to reduce ASW surface ship noise. Projects are directed toward increasing the survivability of ships by making

D. ( ) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. ( ) FY 1990 Accomplishments: Completed analysis of data from prototype at-sea evaluation on Initiated detailed design of for prototype combatant installation. Completed development of sonar data base. Completed preparation of selected DD 963/DDG 993 Class SHIPALTS.

2. ( ) FY 1991 Program: Continue detailed design of prototype system for combatant. Initiate detailed design of CAMs prototype for combatant installation. Complete evaluation of CG 47 Class Ship.

3. ( ) FY 1992 Plans: Continue detailed development of prototype and CAMs for combatants.

4. ( ) FY 1993 Plans: Complete evaluation of DDG 51 Class ship. Continue detailed development of a prototype system and CAMs for combatants. Initiate new design quiet propulsor and noise reduction projects. Continue fleet evaluations, sonar projects and acoustic design support.

5. ( ) Program to Completion: Complete prototype installation of on a combatant. Complete at-sea evaluations of on a combatant. Complete installation and at-sea evaluation of CAMS on a selected combatant. Complete detailed design of initial new design quiet propulsor. Demonstrate at-sea, parallel application of selected technologies on a single combatant.

E. (U) WORK PERFORMED BY: IN-HOUSE: DTRC, Carderock, MD; NUSC, New London, CT; NOSC, San Diego, CA. CONTRACTORS: ARL/PSU, State College, PA; and Epoch Engineering, Gaithersburg, MD.
F. (U) RELATED ACTIVITIES: PE 0602121N and PE 0602323N (Ship and Submarine Technology); PE 0604561N (SSN 21).
G. (U) OTHER APPROPRIATION FUNDS: Not applicable.
H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603561N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Advanced Submarine Systems Development

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL COMPLETE
S2033	Adv Sub Systems Dev	18,845	31,425	17,992	78,608	Continue	Continue
S2034	R&D Submarine	8,595	16,257	17,629	29,925	Continue	Continue
	TOTAL	27,440	47,682	35,621	108,553	Continue	Continue

B. (U) DESCRIPTION: The principal challenge to the U.S. Navy is to optimize state-of-the-art and leading edge technology to ensure our submarines are technologically superior and capable of implementing the Nation's Maritime Strategy worldwide. This program supports revolutionary research and developments in submarine technologies and their evaluation and demonstration on a submarine platform within current fiscal constraints. The intent of the program is to increase the application of the technology base, to provide subsystem design options not currently feasible, to support the current submarine force's technology improvement requirements, and provide a hedge against unforseen technology advances. Project S2033 takes the most promising of these technologies into specific advanced developments. The program includes the transition of high priority technologies developed by Navy technology bases, innovative technologies developed by the private sector, the Congressionally mandated DARPA Advanced Submarine Technology Program, establishment of an SSN Security and Effectiveness Program. All advanced systems developed under this program have potential to support a program for SSN systems improvements. With a fiscally constrained program, the initial emphasis is on signature control for all classes of attack submarines. Project S2034 will provide optimized time and space for demonstrating at sea advanced technologies and concepts on board an operational attack submarine, the interim R&D submarine and for the design, prefabrication and installation of modifications to the long term R&D submarine. These developments will directly support the attack submarine mission to aggressively seek out and destroy enemy submarines and surface ships across a wide spectrum of tactical scenarios as well as supporting the power projection mission of the submarine force.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603561N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Advanced Submarine Systems Development
PROJECT NUMBER: S2033 PROJECT TITLE: ADVANCED SUBMARINE SYSTEMS DEVELOPMENT

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL COMPLETE
S2033	Adv Sub Systems Dev	18,845	31,425	17,992	78,608	Continue	Continue

B. (U) DESCRIPTION: The principal challenge to the U.S. Navy is to optimize state-of-the-art and leading edge technology to ensure our submarines are technologically superior and capable of implementing the Nation's Maritime Strategy worldwide. This project will provide the advanced submarine subsystem technology required to support these requirements. This program includes funding for transitions of high priority projects from the Congressionally mandated DARPA Submarine Technology Program in accordance with the DARPA Transition Plan, the SSN Security and Effectiveness Program (SEP), and a program for SSN Subsystem Improvement. Due to fiscal constraints, signature reduction technologies predominate in the selection of transition products, including the DARPA technologies. Candidate transitions include target strength, radiated noise and structural acoustic projects. All advanced systems developed under this project have potential to support a program for SSN Improvements. The SEP focus is to decrease the detection vulnerability of attack submarines. The overall intent of the Advanced Submarine Systems Development Program is to increase applications of the submarine technology base, to provide subsystem design options not currently feasible, to support the current submarine forces' technology improvement requirements and to provide a hedge against unforeseen technology advances.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:
   a. (U) Began fabrication of HY-130 steel hull section and transitioned effort to PE 0604561N/S1946.
   b. (U) Continued development of advanced high strength material applications to include composites for weight and signature reductions.
   c. (U) Transitioned support for operation of the Large Scale Vehicle (LSV) from P.E. 0604561N and commenced use as a test platform for advanced development programs.
   d. (U) Established formal process for evaluation of emerging technologies and for incorporating these in long range technology development plans.
   e. (U) Continued UUV development in tactical acoustic systems and award contracts for mine search system and remote surveillance systems.
   f. (U) Completed ship impact studies and integrated the electromagnetic launch system design with the R&D Submarine.
   g. (U) Initiated an SSN Security and Effectiveness Program.
   h. (U) Initiated transition of DARPA technologies.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603561N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Advanced Submarine Systems Development
PROJECT NUMBER: S2033 PROJECT TITLE: ADVANCED SUBMARINE SYSTEMS DEVELOPMENT

2. (U) FY 1991 PROGRAM:
a. (U) Continue development of advanced high strength material applications, including composites.
b. (U) Initiate development of advanced non-acoustic silencing techniques.
c. (U) Continue to evaluate emerging technologies and to incorporate these technologies into existing R&D plans.
d. (U) Continue utilization of and support for the LSV as an advanced technology test platform.
e. (U) Complete detail design and assess applicability of an electromagnetic launch system Advanced Technology Demonstration (ATD) for testing on the R&D Submarine.
f. (U) Complete UUV tactical acoustic systems development and conduct transition and Navy mission demonstrations. Continue mine search systems and remote surveillance systems. Transition effort to PE 0604559N/S2094 Deep Submergence Technology.
g. (U) Perform assessments for SSN improvements.
h. (U) Continue development of an SSN Security and Effectiveness Program.
i. (U) Complete NiCd Battery Development Program, Phase I.

3. (U) FY 1992 PLANS:
a. (U) Continue utilization of, and support for, the LSV as an advanced technology test platform.
b. (U) Continue development of composite main propulsion shaft.
c. (U) Continue development of advanced non-acoustic silencing techniques.
d. (U) Continue to evaluate emerging technologies and to incorporate these technologies into existing R&D plans.
e. (U) Continue an SSN Security and Effectiveness Program; investigation of techniques for signature control.

4. (U) FY 1993 PLANS:
a. (U) Continue LSV utilization and support.
b. (U) Continue to evaluate emerging technologies.
c. (U) Continue existing advanced development work and initiate additional projects in support of a program for SSN improvements.
d. (U) Continue an SSN Security and Effectiveness Program; development of advanced signature control devices.
e. (U) Continue Advanced Battery Development Program.
f. (U) Initiate Advanced Hydraulic Systems Development Program.
g. (U) Initiate Advanced Propulsor Development Program.
h. (U) Initiate Submarine Survivability and Damage Control Program.
i. (U) Initiate assessment of electric drive main propulsion.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603561N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Advanced Submarine Systems Development
PROJECT NUMBER: S2033 PROJECT TITLE: ADVANCED SUBMARINE SYSTEMS DEVELOPMENT

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: DTRC, Bethesda, MD; NADC, Warminster, PA; NOSC, San Diego, CA; NUSC, Newport, RI; NRL, Washington, DC; Mare Island NAVSHIPYD, Vallejo, CA; NCSC, Panama City, FL; NSWC, Dahlgren, VA; DARPA, Arlington, VA; NUWES, Keyport, WA; and COMSPAWARSYSCOM, Washington, DC; CONTRACTORS: General Dynamics, Electric Boat Division, Groton, CT; Newport News Shipbuilding, Newport News, VA; Eastport International, Bowie, MD; ARL/Penn State, State College, PA; APL/Johns Hopkins Univ., Laurel, MD; and other laboratories and industry as appropriate.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: EML terminated. Auxilary Systems Program slowed, LSV, Sub R&D Integration, Non-acoustice silencing, UUV, and SSN Security efforts slipped to FY 1992.

3. (U) COST CHANGES: None.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: Most submarine related RDT&E programs will provide inputs into Program Element 0603561N in the form of new technologies, systems, and components that can be used on the SSN-21 submarine class. The principal related program elements are 0604561N, SSN 21 Development; 0603504N, Advanced Submarine ASW Dev; 0603522N, Submarine Arctic Warfare Support Equip Program; 0603562N, Submarine Tactical Warfare Systems; and 0603570N, Advanced Nuclear Reactor Components and Systems.

H. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

J. (U) MILESTONE SCHEDULE: Not applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603561N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Advanced Submarine Systems Development
PROJECT NUMBER: S2034 PROJECT TITLE: R&D SUBMARINE

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL COMPLETE
S2034	R&D Submarine	8,595	16,257	17,629	29,925	Continue	Continue

B. (U) DESCRIPTION: This project will provide optimized time and space aboard an at-sea attack submarine, the interim R&D submarine, for demonstrating advanced technologies/concepts to permit early operator input to the prototype development process. Developments from Navy, DARPA, and industry will be accommodated. Additionally, the attack submarine will be modified (long term R&D submarine) to significantly enhance its ability to accommodate multiple, high payoff technologies. Modifications include a large diameter torpedo tube to support the evaluation of future heavyweight torpedoes and UUV's, modifications for evaluation of speed enhancement mechanisms, a turtleback to house external components such as developmental towed array handling systems, stern modifications for evaluating advanced propulsors and control surfaces, large access opening for installation and removal of large diameter weapons, UUV's and project equipment, an instrumentation system and test center to provide platform data and project equipment space and additional ship's services and penetrations to support project equipment installations. The R&D submarine will maintain its warfighting capability in addition to a principal mission of supporting submarine R&D.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS: Awarded contract for detailed design and prefabrication of submarine modifications necessary to support R&D objectives.

2. (U) FY 1991 PROGRAM:
a. (U) Continue submarine modification detailed design effort.
b. (U) Initiate long lead procurement.
c. (U) Commence prefabrication of modification components.
d. (U) Begin modification integration into overhaul work package.
e. (U) Continue project evaluations on R&D submarine.

3. (U) FY 1992 PLANS:
a. (U) Complete submarine modification design.
b. (U) Continue prefabrication of modification components.
c. (U) Continue modification integration into overhaul work package.
d. (U) Continue project evaluations on R&D submarine.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603561N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Advanced Submarine Systems Development
PROJECT NUMBER: S2034 PROJECT TITLE: R&D SUBMARINE

4. (U) FY 1993 PLANS:
   a. (U) Complete prefabrication of modification components.
   b. (U) Complete modification integration into overhaul work package.
   c. (U) Ship and stage modification material/equipment at installing activity (PNS).
   d. (U) Continue project evaluations on R&D submarine.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: DTRC, Bethesda, MD; NUSC, New London, CT; NUSC, Newport, RI; PNSY, Portsmouth, NH; NNSY, Portsmouth, VA; SUBMEPP, Portsmouth, NH; CONTRACTORS: General Dynamics, Electric Boat Division, Groton, CT; Rosenblatt, New York, NY; J.J. McMullen, Arlington, VA; CASDE, Arlington, VA; and other industry as appropriate.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: None.

2. (U) SCHEDULE CHANGES: None.

3. (U) COST CHANGES: None.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: This project will support the development and demonstration of technologies and hardware developed under each project within S2033 of this program element, other submarine related Navy programs, and the DARPA Advanced Submarine Technology Program. The principal contributing programs will be 0603504N, Advanced Submarine ASW Dev; 0603522N, Submarine Arctic Warfare Support Equip Program; 0603570N, Advanced Nuclear Reactor Components and Systems; 0604502N, Submarine Communications; 0604503N, Submarine Sonar Development; 0604561N, SSN 21 Development; 0604562N, Submarine Tactical Warfare System; and 0604567N, Ship Development.

H. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

J. (U) MILESTONE SCHEDULE: Not applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603562N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Submarine Tactical Warfare System (Advanced)
PROJECT NUMBER: S1739 PROJECT TITLE: Submarine Arctic Warfare

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1739	Submarine Arctic Warfare	7,232	7,330	7,013	7,024	CONT	CONT

B. ( ) DESCRIPTION: This program responds to
It develops advanced capabilities for
Efforts include,

C. ( ) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. ( ) FY 1990 Accomplishments:
   a. ( ) Conducted ICEX 1-90

2. ( ) FY 1991 Program:
   a. ( ) Conduct

3. ( ) FY 1992 Plans:
   a. ( ) Conduct

4. ( ) FY 1993 Plans:
   a. ( ) Conduct,

5. (U) Program to Completion: This is a continuing program.

D. (U) WORKED PERFORMED BY: IN-HOUSE: NOSC, San Diego, CA; NUSC, Newport, RI; DTRC, Carderock, MD. NRL, D.C.. CONTRACTORS: APL-University of Washington, Seattle, WA; Analysis and Technology Inc., North Stonington, CT; ARL-University of Texas, Austin, TX.

E. (U) RELATED ACTIVITIES: (a) PEs 0602314N ASW Technology, 0602323N Submarine Technology, and 0602435N Ocean and Atmosphere Support Technology provide technologies for advanced development efforts; (b) PEs 0604561N SSN 21 Development and 0604524N Submarine Combat System incorporate Arctic specific improvements.

F. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603564N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Ship Development (Advanced)

A. (U) **RESOURCES:** (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TOTAL PROGRAM
S0408	Ship Development (Advanced)	3,442	1,347	5,847	3,552	CONT.
S2036	Ship Design Methods, Plans, Concepts	0	0	11,420	13,949	CONT.
S2087	Fast Sealift Ship	11,598	3,388	0	0	
	TOTAL	15,040	4,735	17,267	17,471	CONT.

B. (U) **DESCRIPTION:** The overall objective of the Ship Development (Advanced) Program is to enhance the Navy's ability to design more capable ships at reduced cost, with reduced manning and increased producibility and to allow for greater utilization of the latest technology during this process. This program is directly focused at supporting the Navy's Shipbuilding Plan by developing the tools needed and performing the advanced ship design (concept) studies, Feasibility Studies and Preliminary Designs for new ships in that plan. In FY 1992 the work in Project S0408 will be divided into Projects S0408 and S2036 to improve overall management. Project S2036 (Ship Design Methods, Plans and Concepts) is not a new start, but a continuation of a portion of the work accomplished under S0408 in previous years. Project S2036 identifies future surface ship requirements and characteristics necessary to meet future threats; provides the required design tools; develops investment strategies for new concepts and technologies; and performs concept studies which provide system engineering of R&D concepts to develop a Tentative Operational Requirement (TOR). Project S0408, Ship Development (Advanced), performs the dedicated ship Feasibility Studies and Preliminary Designs. Feasibility studies provide the alternatives for the Development Options Paper (DOP). Preliminary Design develops the selected ship alternative as necessary to proceed to Contract Design. Project S2087, Sealift Development, will address those technologies and applications that will benefit the near term sealift ship that will be procured with SCN funds. Longer range effects will not be identified until the Defense Mobility Study has been completed.

FY 1992 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603564N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Development (Advanced)
PROJECT NUMBER: S0408 **PROJECT TITLE:** Ship Development (Advanced)

C. (U) DESCRIPTION: For FY 1990 and FY 1991, this project performs the first three phases of design (Advanced Concept Studies, Feasibility and Preliminary Design) for all new surface ships in the Navy's Shipbuilding Program. Performs impact studies of warfare, hull, machinery and electrical subsystems on advanced ship designs. Develops the initial documentation and the design methodology required by government for the design of surface ships in the Shipbuilding Program. Develops and evaluates unconventional hull form concepts suitable for future acquisiiton. For FY 1992 and future years this project will perform only the Feasibility Studies and Preliminary Designs for all new surface ships in the Navy's Shipbuilding Program which have reached Milestone 0 (i.e., a Tentative Operational Requirement has been issued). Completion of these phases allows OPNAV to review and approve transfer of a ship design to the Ship Contract Design Program, PE 0604567N. All Pre-milestone 0 work will be accomplished under Project S2036 in FY 1992 and the out-years.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Began AR(X) feasibility study. Began L(X) feasibility study. Assessed warfare, hull, machinery and electrical subsystems for advanced ships. Continued development of total ship design methodology, including structures, ship producibility, and electromagnetic systems engineering. Defined and planned HM&E subsystem technology improvements for advanced ships (e.g., fiber optics impact). Continued Seaway Performance Improvement Program.
2. (U) FY 1991 Program: Conduct feasibility studies for L(X); begin L(X) preliminary design. Continue development of total ship design methodology. Perform HM&E and combat systems assessment of future BFCs and other support ships. Assess warfare and HM&E subsystems for advanced ships. Define and plan HM&E subsystem technology improvements for advanced ships.
3. (U) FY 1992 Plans: Continue preliminary design for L(X) and AR (X).
4. (U) FY 1993 Plans: Conduct feasibility studies for ships in the SCN plan (e.g., CVN(X) and AR(X)).
5. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NOSC, Panama City, FL; DTRC, Bethesda, MD; NSWC, White Oak, MD; NOSC, San Diego,CA. CONTRACTOR: John J. McMullen Assoc. Inc., Arlington, VA; Bath Iron Works, Bath, ME; Advanced Marine Enterprises, Arlington, VA; Rockwell International Corp., Arlington, VA.

F. (U) RELATED ACTIVITIES: PE 0603508N, Ship Propulsion System (Advanced); PE 0603513N, Shipboard System Component Development; PE 0604567N, Ship Subsystem Development/LBTS (Advanced); PE 0602121N, Surface Ship Technology; PE 0603573N, Electric Drive.

G. (U) OTHER APPROPRIATION FUNDS: None.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None

FY 1992 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603564N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Development (Advanced)
PROJECT NUMBER: S2036 PROJECT TITLE: Ship Design Methods, Plans, Concepts

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TOTAL PROGRAM
S2036	Ship Design Methods, Plans, Concepts	0(Note 1)	0(Note 1)	11,317	13,980	CONT.

Note 1: The work in this project was accomplished under Project S0408 prior to FY 92. This Project is not a new start.

B. (U) DESCRIPTION: This Project continues the early stage, Pre-milestone 0, work accomplished under Project S0408 in the years prior to FY 1992. Post Milestone 0 work, i.e., Ship Feasibility Studies and Preliminary Designs, which are ship specific, are accomplished under Project S0408 and support ships included in the SCN plan. This project will continue to identify future surface ship requirements and characteristics necessary to meet future threats. It will investigate new ship concepts not included in the SCN plan and evaluate potential technologies necessary to support these concepts. It will provide the required design tools to develop and evaluate these ship concepts. Finally, it will develop investment strategies for new concepts and technologies and will support development of tentative operational requirements (TORs) for future ships. This project will be directed and monitored by a Ship Characteristics and Improvement Board Working Group (SCIB WG) working in conjunction with NAVSEA. This project will serve as the foundation for future U.S. Navy ship design, construction and life cycle support. It will be the first step in the integration of the total ship system including the combat systems and the hull, mechanical and electrical (HM&E) systems.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. Accomplishments listed under Project S0408.
2. (U) FY 1991 Program:
   a. Program described under Project S0408.
3. (U) FY 1992 Plans:
   a. Identify, characterize and assess new and emergent technologies.
   b. Integrate new technologies in total ship concepts such as future battle force combatants and support ships.
   c. Develop R&D plans and investment strategies which provide cost/benefit comparisons of these new concepts and technologies.
   d. Develop and improve design methods, criteria, standards and data bases including ship structure design criteria and electromagnetic engineering tools and procedures.
4. (U) FY 1993 Plans:
   a. Identify, characterize and assess new and emergent technologies.
   b. Integrate new technologies in total ship concepts such as future battle force combatants and support ships.
   c. Develop R&D plans and investment strategies which provide

PROGRAM ELEMENT: 0603564N BUDGET ACTIVITY:4
PROGRAM ELEMENT TITLE: Ship Development Advanced
PROJECT NUMBER: S2036 PROJECT TITLE: Ship Design Methods, Plans, Concepts

cost/benefit comparisons of these new concepts and technologies.
d. Develop and improve design methods, criteria, standards and data bases including ship structure design criteria and electromagnetic engineering tools and procedures.

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NCSC, Panama City, FL; DTRC, Bethesda, MD; NSWC, White Oak, MD; NOSC, San Diego,CA. CONTRACTORS: John J. McMullen Associates Inc., Arlington, VA; Gibbs and Cox, Arlington, VA; Johns Hopkins University/Applied Physics Laboratory, Laurel, MD.; Rockwell International Corp., Arlington, VA.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
1. (U) Technology Changes: None.
2. (U) Schedule Changes: None.
3. (U) Cost Changes: None.

F. (U) PROGRAM DOCUMENTATION:
1. (U) NAPDD #238-03 6/90
NAPDD #248-03 10/90
Extended Planning Annex

G. (U) RELATED ACTIVITIES: PE 0603508N, Ship Propulsion System (Advanced); Program Element 0603513N, Shipboard System Component Development; Program Element 0604567N, Ship Subsystem Development/LBTS (Advanced); Program Element 0602121N, Surface Ship Technology.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands) None.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

J. (U) MILESTONE SCHEDULE: Not Applicable.

FY 1992 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603564N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Development (Advanced)
PROJECT NUMBER: S2036 PROJECT TITLE: Ship Design Methods, Plans, Concepts

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TOTAL PROGRAM
S2036	Ship Design Methods, Plans, Concepts	0(Note 1)	0(Note 1)	11,317	13,980	CONT.

Note 1: The work in this project was accomplished under Project S0408 prior to FY 92. This Project is not a new start.

B. (U) DESCRIPTION: This Project continues the early stage, Pre-milestone 0, work accomplished under Project S0408 in the years prior to FY 1992. Post Milestone 0 work, i.e., Ship Feasibility Studies and Preliminary Designs, which are ship specific, are accomplished under Project S0408 and support ships included in the SCN plan. This project will continue to identify future surface ship requirements and characteristics necessary to meet future threats. It will investigate new ship concepts not included in the SCN plan and evaluate potential technologies necessary to support these concepts. It will provide the required design tools to develop and evaluate these ship concepts. Finally, it will develop investment strategies for new concepts and technologies and will support development of tentative operational requirements (TORs) for future ships. This project will be directed and monitored by a Ship Characteristics and Improvement Board Working Group (SCIB WG) working in conjunction with NAVSEA. This project will serve as the foundation for future U.S. Navy ship design, construction and life cycle support. It will be the first step in the integration of the total ship system including the combat systems and the hull, mechanical and electrical (HM&E) systems.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. Accomplishments listed under Project S0408.
2. (U) FY 1991 Program:
   a. Program described under Project S0408.
3. (U) FY 1992 Plans:
   a. Identify, characterize and assess new and emergent technologies.
   b. Integrate new technologies in total ship concepts such as future battle force combatants and support ships.
   c. Develop R&D plans and investment strategies which provide cost/benefit comparisons of these new concepts and technologies.
   d. Develop and improve design methods, criteria, standards and data bases including ship structure design criteria and electromagnetic engineering tools and procedures.
4. (U) FY 1993 Plans:
   a. Identify, characterize and assess new and emergent technologies.
   b. Integrate new technologies in total ship concepts such as future battle force combatants and support ships.
   c. Develop R&D plans and investment strategies which provide

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603570N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Advanced Nuclear Power Systems

A. (U) RESOURCES: (Dollars in thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMP	TOTAL PROGRAM
S1258	Nuclear Technology Development	34,861	50,485	59,672	61,361	Cont.	Cont.
S1914	S6W Nuclear Propulsion Plant	28,699	29,059	30,212	30,987	31,725	449,699
	TOTAL	63,560	79,544	89,884	92,348	Cont.	Cont.

B. ( ) DESCRIPTION: Work is directed toward the design, development and test of new and improved components and their related systems for use in nuclear propulsion plants. The intent is to develop safe, reliable, high performance, long life nuclear propulsion plants and components. Work includes developing the aspects of a nuclear propulsion plant for the new SEAWOLF class attack submarine. Work in other areas includes development of instrumentation and control equipment, fluid and heat transfer equipment, reactor plant equipment, and nuclear power technology for future fleet applications. Significant heat transfer technology improvements are being developed. Work underway to improve steam generators, if successful, will significantly and increase plant efficiency by improving heat transfer capability. New instrumentation and control equipment is needed because various fleet equipment is difficult to support, requires a growing maintenance effort and does not have the accuracy, reliability and efficiency offered with modern technology. In addition, better component and system designs are being developed to improve performance.

PROGRAM ELEMENT: 0603570N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Advanced Nuclear Power Systems
PROJECT NUMBER: S1258 PROJECT TITLE: Nuclear Technology Development

A. (U) RESOURCES: (Dollars in thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMP	TOTAL PROGRAM
S1258	Nuclear Technology Development	34,861	50,485	59,672	61,361	Continuing	

B. (U) DESCRIPTION: The purpose is to design, develop, and test new and improved reactor components and systems for use in all types of naval nuclear propulsion plants.

C. ( ) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. ( ) FY 1990 ACCOMPLISHMENTS:

a. (U) Developed and tested advanced heat transfer technology to improve efficiency and prolong life expectancy and conducted reactor plant optimization and configuration work applicable to an improved propulsion plant.

b. ( ) Designed better instrumentation and control equipment including qualification of monitoring and indication equipment, developed advanced reactor plant detectors and designed advanced diagnostic equipment to improve maintenance capability.

c. ( ) Developed improved fluid transfer equipment emphasizing improved features.

d. ( ) Developed reactor plant designs.

2. ( ) FY 1991 PROGRAM:

a. ( ) Continue advanced heat transfer technology efforts to improve efficiency and prolong life expectancy and conduct reactor plant optimization and configuration work. Develop and evaluate improved components and plant configurations to ensure system compatibility.

b. ( ) Develop advanced, more reliable power supplies.

c. ( ) Design and develop new instrumentation and control equipment. Develop advanced reactor plant detectors, diagnostic equipment, sensors, and data transmission means.

d. ( ) Continue to develop fluid transfer and electrical equipment

e. ( ) Continue to develop reactor plant designs.

PROGRAM ELEMENT: 0603570N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Advanced Nuclear Power Systems
PROJECT NUMBER: S1258 PROJECT TITLE: Nuclear Technology Development

3. ( ) FY 1992 PLANS:

a. ( ) Continue to develop advanced heat transfer technology. Begin developing the design concept for a heat exchanger application. Conduct reactor plant optimization and configuration work. Continue to develop and evaluate improved components and plant configurations to ensure system compatibility.

b. ( ) Develop advanced design power supplies. Develop better data transmission means.

c. ( ) Design and develop advanced instrumentation and control equipment. Initiate designs for improved performance, reduced costs, and potential for increased operator

d. ( ) Develop improved fluid transfer and electrical equipment

e. ( ) Continue to develop reactor plant designs.

4. ( ) FY 1993 PLANS:

a. ( ) Continue testing to support the design concept. Finalize the conceptual design for application. Continue to develop and evaluate improved components and plant configurations to ensure system compatibility.

b. ( ) Continue the design and development of advanced power supplies and develop better data transmission means.

c. ( ) Continue to design and develop advanced instrumentation and control equipment and continue design efforts

d. ( ) Continue to develop improved fluid transfer and electrical equipment. Conduct tests

e. ( ) Continue to develop reactor plant designs.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: Contractors: Westinghouse Electric Corporation, Bettis Atomic Power Laboratory and Plant Apparatus Division, Pittsburgh, PA; General Electric Company, Knolls Atomic Power Laboratory and Machinery Apparatus Operation, Schenectady, NY.

PROGRAM ELEMENT: 0603570N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Advanced Nuclear Power Systems
PROJECT NUMBER: S1258 PROJECT TITLE: Nuclear Technology Development

E. ( ) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not Applicable.
2. ( ) Schedule changes: development
3. (U) Cost changes: None.

F. (U) PROGRAM DOCUMENTATION: Not Applicable.

G. (U) RELATED ACTIVITIES: This project is related to PE 0602324N, Nuclear Propulsion Technology and PE 0205675N, Operational Reactor Development. There is no duplication of effort within the Navy or the Department of Defense.

H. (U) OTHER APPROPRIATION FUNDS: This is a non acquisition program.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE: Not Applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603570N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Advanced Nuclear Power Systems

A. (U) RESOURCES: (Dollars in thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMP	TOTAL PROGRAM
S1914	S6W Nuclear Propulsion Plant	28,699	29,059	30,212	30,987	31,725	449,699

B. ( ) DESCRIPTION: This effort is developing aspects of the nuclear propulsion plant for the new attack submarine (SEAWOLF). Work is directed toward design, development, and test of pumps, instrumentation and control equipment, valves, heat transfer equipment, and plant arrangements. A key objective is to meet stringent goals so the new attack submarine will have an advantage over Soviet submarines well into the next century. Accomplishing requires applying new features throughout the plant and especially to large rotating equipment. Also, the propulsion plant will be increased to achieve the overall displacement and performance goals.

C. ( ) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. ( ) FY 1990 ACCOMPLISHMENTS:
   a. ( ) Evaluated and analyzed designs for reactor components such as pumps, valves, and heat transfer equipment to ensure engineering goals for improved performance are met.
   b. ( ) Developed and tested instrumentation and control equipment

   c. (U) Developed and qualified plant components, systems and arrangements.

2. ( ) FY 1991 PROGRAM:
   a. ( ) Continue to evaluate and analyze designs for reactor components such as pumps and valves and heat transfer equipment to ensure engineering goals for improved performance are met.

PROGRAM ELEMENT: 0603570N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Advanced Nuclear Power Systems
PROJECT NUMBER: S1914 PROJECT TITLE: S6W Nuclear Propulsion Plant

b. ( ) Complete testing of instrumentation and control equipment

c. (Continue to design, develop, and qualify plant components, fluid systems and shielding to support equipment procurement and ship construction schedules;
Prepare system drawings and operating and acceptance test procedures. Test components ,to confirm adequacy.

3. (FY 1992 PLANS:
a. (U) Continue to evaluate and test reactor plant components such as pumps, valves, and heat transfer equipment.
b. (Continue check out and compatibility testing of instrumentation and control systems

c. ( ) Qualify plant components, systems and arrangements:
1. ( ) Continue detailed fluid system, shielding, and component designs to support equipment procurement and ship construction schedules; analyze designs

2. (U) Continue to prepare and review system drawings, and operating and acceptance test procedures.
3. ( ) Test components and systems

4. ( ) FY 1993 PLANS:
a. (U) Complete evaluating reactor plant components.
b. ( ) Continue compatibility testing of instrumentation and control systems

c. ( ) Qualify plant components, systems, and arrangements:
1. (U) Complete detailed component design to support equipment procurement; continue fluid systems and shielding design and drawings to support ship construction schedule.
2. (U) Continue preparing and revising systems drawings, develop and verify operating and acceptance test procedures.
3. ( ) Continue integrated systems and components tests.

5. (U) PROGRAM TO COMPLETION: This project will be considered complete in FY 1994, the year before the SEAWOLF is scheduled to go to sea.

D. (U) WORK PERFORMED BY: Contractors: Westinghouse Electric Corporation, Bettis Atomic Power Laboratory and Plant Apparatus Division, Pittsburgh, PA; General Electric Company, Knolls Atomic Power Laboratory and Machinery Apparatus Operation, Schenectady, NY.

PROGRAM ELEMENT: 0603570N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Advanced Nuclear Power Systems
PROJECT NUMBER: S1914 PROJECT TITLE: S6W Nuclear Propulsion Plant

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
1. (U) Technology changes: Not Applicable.
2. (U) Schedule changes: Not Applicable.
3. (U) Cost changes: Not Applicable.

F. (U) PROGRAM DOCUMENTATION: Not Applicable.

G. (U) RELATED ACTIVITIES: This project is related to PE 0602324N, Nuclear Propulsion Technology and PE 0205675N, Operational Reactor Development. There is no duplication of effort within the Navy or the Department of Defense.

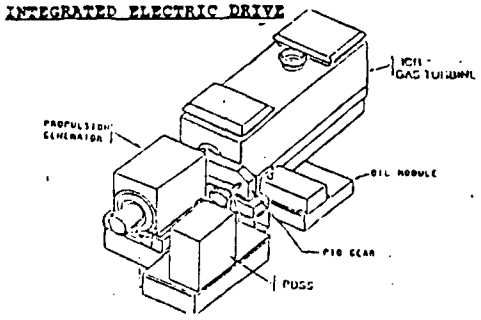
H. (U) OTHER APPROPRIATION FUNDS: This is a non acquisition program.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE: Not Applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603573N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: ELECTRIC DRIVE
PROJECT NUMBER: S1314 PROJECT TITLE: ELECTRIC PROPULSION SYSTEM
POPULAR NAME: INTEGRATED ELECTRIC DRIVE



A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	TO COMPLETE
PROGRAM MILESTONES					ED MSIII/FY97 ICR MSIII/FY97
ENGINEERING MILESTONES			ED PDR/2Q	ED CDR/3Q	
T&E MILESTONES			ICR Start DTII/3Q	ED Initiate manf. test/3Q	
CONTRACT MILESTONES		ED RFP/Mod/2Q ICR RFP/2Q	ICR AWARD/1Q		

BUDGET ($K)	FY 1990	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL TO COMPLETE
MAJOR	17,487	36,370	70,556	174,800	CONTINUING PROGRAM
SUPPORT CONTRACT(S)	500	300	500	500	CONTINUING PROGRAM
IN-HOUSE SUPPORT	12,670	16,716	9,750	18,978	CONTINUING PROGRAM
GFE/OTHER	100	100	100	100	CONTINUING PROGRAM
TOTAL	30,757 *	53,486 *	80,906	194,378	CONTINUING PROGRAM

* Previously funded in Budget Activity 2

PROGRAM ELEMENT: 0603573N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: ELECTRIC DRIVE
PROJECT NUMBER: S1314 PROJECT TITLE: ELECTRIC PROPULSION SYSTEM
POPULAR NAME: INTEGRATED ELECTRIC DRIVE

B. (U) DESCRIPTION: In the FY90 Authorization Act, Congress directed the Navy to establish the Integrated Electric Drive (IED) Program in one Program Element by combining the Ship Propulsion Program (PE 0603508N) and the Shipboard System Component Program (PE 0603513N) with the Electric Drive Program (PE 0603573N). In 1990, Congress directed that IED must be at sea by the year 2000.

Electric drive transmission provides the capability to design, rearrange, interconnect, and operate without the constraints imposed by long mechanical shaftline runs. Electric drive with Propulsion Derived Ship Service (PDSS) and ICR provides fuel efficiency and survivability benefits, as well as improved ship design flexibility and system arrangements. The acquisition cost of IED ships (follow) will be approximately 5% above baseline mechanical drive variants. These increased acquisition costs will be partially offset by savings in fuel costs from the utilization of electric drive and ICR technologies. AC electric drive includes those system components that provide electrical power transmission between the propulsion prime movers and the propeller. Electric drive also includes PDSS power generation which is accomplished by driving a variable speed/high frequency generator from the propulsion turbine. A solid state converter is used to convert the high, variable frequency generator output into constant 60 hertz, 450 volt ship service power. Major ED components include liquid cooled alternating current motors, generators, solid state frequency changers, and epicyclic reduction gears. Other vital components include high power switchgear, cooling systems, transmission lines, and controls. The ICR gas turbine engine will provide an increased power rating to 31,500 HP; a 25-30% fuel efficiency improvement; and is required to take full advantage of IED potential including PDSS. Also, ICR reduced exhaust temperatures will permit investigation of innovative exhaust ducting systems.

Prior to FY90, the ED program was structured as a NON-ACAT program to develop a system demonstrating the technology for incorporating electric drive in a future Battle Force Combatant (BFC) ship award, circa FY2003. To meet the intent of the Congressional direction to put IED at sea prior to the year 2000, a full scale engineering development program has been structured for ED (liquid cooled AC/AC electric drive transmission with PDSS) and Intercooled Recuperated (ICR) engine with a target for production decision/service

PROGRAM ELEMENT: 0603573N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: ELECTRIC DRIVE
PROJECT NUMBER: S1314 PROJECT TITLE: ELECTRIC PROPULSION SYSTEM
POPULAR NAME: INTEGRATED ELECTRIC DRIVE

approvals in FY97. The candidate program is a post FY 1997 DDg/BFC. This system will be designed to be compatible with the ICR as well as the present LM2500 gas turbine.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENT:
   a. (U) Conducted Preliminary Design Review on current (NON-ACAT) electric drive design.
   b. (U) Conducted system engineering studies, ship feasibility studies, acoustic characterization studies, and cost effectiveness studies for IED.
   c. (U) Commenced planning and restructuring of program to meet Congressional direction.
   d. (U) Revised electric drive Acquisition Plan to modify and upgrade the electric drive system to MIL-SPEC qualified surface combatant equipment suitable for a FY 97 initial production approval decision.
   e. (U) Modified RFP for a 31,500 HP ICR gas turbine engine design, development, construction and test of a full scale, full MIL-SPEC ICR engine suitable for a FY 97 initial production approval decision.
2. (U) FY 1991 PROGRAM:
   a. (U) Release RFP and modify electric drive contract; initiate upgrade of preliminary design of AC generator/distribution system components; initiate preliminary design for motor drive system and PDSS components.
   b. (U) Release RFP for ICR engine contract.
3. (U) FY 1992 PLANS:
   a. (U) Award ICR engine contract and initiate detailed design and component tests.
   b. (U) Conduct Preliminary Design Review on ED system and initiate detail design.
4. (U) FY 1993 PLANS:
   a. (U) Continue ICR engine component tests and commence system tests.
   b. (U) Conduct ED Critical Design Review; initiate electric drive component manufacture.
5. (U) Program to Completion: FY97 initial production decisions on AC electric drive with PDSS system and ICR engine.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603582N BUDGET ACTIVITY: 4
PROGRAM ELEMENT: TITLE: Combat System Integration
PROJECT NUMBER: S0164 PROJECT TITLE: Combat System Integration

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0164	Combat System Integration	9,514	10,116	9,730	9,907	Cont	Cont

B. (U) DESCRIPTION: This project provides shore based testing of integrated combat direction, weapon, sensor and computing systems prior to their installation in operational fleet units. System computer programs are assembled and tested to assure proper configuration and interoperability prior to their utilization in an operational environment.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:

a. (U) Continued integration testing of new and upgraded combat system capabilities in all warfare areas and across all applicable ship classes.

b. (U) Conducted integration testing of Tactical Acoustic System (TAS) and SLQ-32(V)4 in CV/CVN classes and New Threat Upgrade and SLQ-32 in CG 16/26 classes.

2. (U) FY 1991 PROGRAM:

a. (U) Complete integration testing of: AN/SYS-2 and AN/SPS-48E Radar in CV/CVN classes, C2P and Advanced Combat Direction System (ACDS) (Block 0) in CG 16/26 and ASWCS Upgrade in DD 963 classes.

b. (U) Continue Overall Combat System Operability Test (OCSOT) development and Surface Ship Combat System-Master Plan (SSCSMP) update.

3. (U) FY 1992 PLANS:

a. (U) Initiate integration testing of ACDS Block 1 in CV/CVN classes.

b. (U) Complete integration testing of C2P and ACDS Block 0 in CV/CVN classes and, New Threat Upgrade in CGN 36 class.

c. (U) Continue OCSOT development and SSCSMP update.

4. (U) FY 1993 PLANS:

a. (U) Complete integration testing of ACDS Block 1 and Antisubmarine Warfare Module 5.1 in CV/CVN classes, Underwater Fire Control System Mk 116/8 and SLQ-32(V)3 in DD 963 class, C2P in CGN 38 class, and Global Positioning System and Light Airborn Multipurpose System Mk III in FFG 7 class.

b. (U) Continue OCSOT development and SSCSMP update.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: INTCOMBATSYSTESTFAC, San Diego, CA; NAVSWC, Dahlgren, VA; NAVSHIPWPNSENGSTA, Port Hueneme, CA; FLTCOMBATDIRSSACT, Dam Neck, VA and San Diego, CA. CONTRACTORS: UNISYS, St. Paul, MN; Advanced Technology, Reston VA; Automation Industries, Vitro Lab, Silver Spring, MD; Integrated System Analysts, Inc., Arlington, VA.; COMPTEK Research Inc., Arlington, VA.

E. (U) RELATED ACTIVITIES: PE 0205620N, ASW Combat System Integration, PE 0603228N, CV ASW Module, PE 0604361N, NATO Sea Sparrow, PE 0604372N, New Threat Upgrade, PE 0604508N, Surveillance Radar, PE 0604518N, CIC Conversion, and PE 0604602N, Naval Gunnery Improvement.

F. (U) OTHER APPROPRIATED FUNDS: None.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603588N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: SSBN Survivability
PROJECT NUMBER: S1871 PROJECT TITLE: SSBN Survivability

A. (U) RESOURCES: (Dollars in thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1871	SSBN Survivability	8,786	15,539	17,570	17,870	CONT	CONT

B. ( ) DESCRIPTION: The SSBN Security Program identifies countermeasures for maintaining or enhancing the current tactical superiority and stealth characteristics of the Fleet Ballistic Missile Submarine Force. The SSBN Survivability Program bridges the gap between the SSBN Security Program and full scale development by validating countermeasures and enhancing submarine survivability. The following projects are being developed under the SSBN Survivability Program:

The following countermeasures development programs will start in the out years:

C. ( ) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. ( ) FY 1990 Accomplishments:
   a. ( ) Completed ADM system; conducted a successful sea test
   b. ( ) - Developed system concept; procured work station hardware; completed preliminary transfer function development and sea test planning; participated in RANGEX 1-90
   c. ( ) - Fabricated a redesigned ADM conducted surface tow performance test.
2. ( ) FY 1991 Program:
   a. ( ) - Conduct data analysis; finalize ADM unit and provide updated specification for EDM.

PROGRAM ELEMENT: 0603588N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: SSBN Survivability
PROJECT NUMBER: S1871 PROJECT TITLE: SSBN Survivability

b. ( ) - Conduct sea test and commence data analysis for proof of concept detection, localization and transfer functions.
c. ( ) - Conduct analysis of surface tow evaluation testing; conduct submarine sea test and analyze results.

3. ( ) FY 1992 Plans:
a. ( ) - Test and evaluate quick deployment system.
b. ( ) - Conduct analysis of design optimum system; commence ADM development; conduct (ADM evaluation) sea test.
c. ( ) - Commence ECP development for transition to PMW-180.
d. ( ) - Commence buoy system fabrication and testing; develop strawman system specifications; conduct analysis of Mission-3; deploy sensor on Mission-4.
e. ( ) - Conduct ADM sea testing; develop specification for transition in FY93.
f. ( ) - Prepare for transition from the SSBN Security Program and initiate sea test planning.

4. ( ) FY 1993 Plans:
a. ( ) - Conduct data analysis of sea test, modify algorithm.
b. ( ) - Commence transition assessment; conduct data analysis; finalize ADM system design.
c. ( ) - Complete ECP development; initiate transition to EDM.
d. ( ) - Conduct at sea engineering demonstration Test-1; conduct demonstration test analysis.
e. ( ) - Conduct Mission-4 analysis; conduct at sea system testing; develop system specifications.

5. (U) Program to Completion: This is a continuing program.

D. (U) WORKED PERFORMED BY:
IN-HOUSE: NUSC, New London, CT; DTRC, Bethesda, MD; NRL, Washington, DC; others to be determined.
CONTRACTORS: APL/JHU, Laurel MD; Georgia Tech University, Atlanta GA; Scientific Atlanta, San Diego, CA; Aura Systems, Los Angeles, CA; Northwest Research Associates, Belleview, WA.; others to be determined.

E. (U) COMPARISON WITH REVISED FY 1991 PRESIDENT'S BUDGET:
1. (U) Technology changes: NONE
2. ( ) Schedule changes:

3. (U) Cost changes: None

PROGRAM ELEMENT: 0603588N BUDGET ACTIVITY: 3-Strategic Programs
PROGRAM ELEMENT TITLE: SSBN Survivability
PROJECT NUMBER: S1871 PROJECT TITLE: SSBN Survivability

F. (U) PROGRAM DOCUMENTATION: NAPDD 0128-02 of 25 June 86

G. (U) RELATED ACTIVITIES: SSBN Security Program (PE 0101224N, Project R0092) investigates all potential submarine detection technologies and identifies requirements for developing countermeasures to those technologies. The submarine Acoustic Warfare Project (PE 0101226N, Project S1265) develops acoustic countermeasure launchers and devices which protect the submarine from active sonar detection and torpedo attack.

H. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None

J. ( ) MILESTONE SCHEDULE:
1. ( ) - Provide preliminary spec to NUSC for
2. ( ) - Conduct initial proof of concept sea test
3. ( ) - Conduct submarine ship test
4. ( ) - Conduct first demonstration sea test
5. ( ) - First module at sea demonstration testing
6. ( ) - Conduct port egress sea test
7. ( ) - Conduct at-sea demo test
8. ( ) - Conduct full scale at-sea test
9. ( ) - Conduct ADM sea test

FY 1992/93 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603601N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Mine Development (Advanced)

A. (U) **RESOURCES:** (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S2024	Mine Mk60 (CAPTOR) Improvement/Adv. ASW Mine (SUBSTRIKE)	5,965	3,646	8,874	10,914	Cont.	Cont.
S1917	Remote Control of Mines (RECO)	1,107	0	0	0	0	7,027
1556	Advanced Sea Mine 2000	6,812	0	0	0	0	6,812
	TOTAL	13,884	3,646	8,874	10,914	Cont.	Cont.

B. (U) **DESCRIPTION:** This program provides for the development of new mines, mine systems, and major improvements to existing mine systems necessary to meet the Navy's requirement into the 21st century for mine warfare against evolving targets.

FY 1992/93 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603601N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Mine Development (Advanced)
PROJECT NUMBER: S2024 PROJECT TITLE: Mine Mk60 (CAPTOR) Improvement/Adv. ASW Mine (SUBSTRIKE)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S2024	Mine Mk60 (CAPTOR) Improvement/Adv. ASW Mine (SUBSTRIKE)	5,965	3,646	8,874	10,914	Cont	Cont

B. ( ) DESCRIPTION: Two ASW weapons will be developed in a cooperative, complementary manner.

Subsystem commonality between the two mines will be pursued where justifiable in terms of Life Cycle Cost (LCC) and Integrated Logistics Support (ILS).

1. ( ) The Mine MK 60 Mod 2 ORDALT will maintain weapon effectiveness against the
Improvements will be made in the areas of

2. ( ) The SUBSTRIKE ASW weapon will establish wide-area coverage ASW mining capability in water depths of
and will be effective against the

SUBSTRIKE will be a strong contributor to the Navy's capabilities

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:
1. (U) FY 1990 Accomplishments:
a. (U) Conducted sensor testing under industrial Cooperative Research & Development Agreement (CRDA)
b. (U) Completed final engineering testing of Torpedo Mk46 Mod 6
c. (U) Completed construction of Navy experimental sensor and ancillary hardware and software
d. (U) Began initial at-sea tests of Navy experimental sensor
2. (U) FY 1991 Program:
a. (U) Complete in-water sensor experiments and analyze data
b. (U) Develop system performance specification for CIP
c. (U) Develop D/V contract data package for CIP

PROGRAM ELEMENT: 0603601N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Mine Development (Advanced)
PROJECT NUMBER: S2024 PROJECT TITLE: Mine Mk60 (CAPTOR) Improvement/Adv. ASW Mine (SUBSTRIKE)

d. (U) Milestone I for CIP

3. (U) FY 1992 Plans:

a. (U) Award D/V contract for CIP

b. (U) Plan risk reduction program for SUBSTRIKE detection system.

4. (U) FY 1993 Plans:

a. (U) Continue CIP D/V and begin SUBSTRIKE risk reduction efforts: (1) Magnetic sensor conceptual design; (2) Volumetric array conceptual design.

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: In-house: NAVSWC, White Oak Laboratory, Silver Spring, MD, and Naval Mine Warfare Engineering Activity, Yorktown, VA. Contractor: ARL/University of Texas, Austin, TX. Development Contractor(s) to be selected competitively.

E. ( ) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. ( ) Technology Changes: Previously, CAPTOR Improvement was being conducted as a stand-alone program. Under the combined program, opportunities for common CAPTOR/SUBSTRIKE technology, architecture and subsystems, particularly in the area . This change mitigates risk for the phased follow-on SUBSTRIKE effort while fully supporting the CAPTOR Improvement program.

2. (U) Schedule Changes: Execution of the CAPTOR Improvement/ SUBSTRIKE Program within an acceptable level of technical risk necessitated program restructuring. What was heretofore a CIP-only in-house D/V effort is now structured as a combined CIP/SUBSTRIKE in-house Concept Exploration/Risk Reduction effort. This will add 2 years to the previous CAPTOR Improvement Program milestones and will delay the SUBSTRIKE program milestones stated in OR # 262-03-90. However technical risk, RDT&E/production cost and overall Life Cycle Cost will be reduced.

3. (U) Cost Changes: None

F. (U) PROGRAM DOCUMENTATION:

CAPTOR Improvement OR	3/87
SUBSTRIKE OR	3/90

G. (U) RELATED ACTIVITIES: RECO (PE 0603601N, Proj. S1917).
H. (U) OTHER APPROPRIATION FUNDS: None.
I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

PROGRAM ELEMENT: 0603601N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Mine Development (Advanced)
PROJECT NUMBER: S2024 **PROJECT TITLE:** Mine Mk60 (CAPTOR) **Improvement/Adv. ASW Mine (SUBSTRIKE)**

J. (U) MILESTONE SCHEDULE:

	CAPTOR Improvement
MS I	4Q FY91
MS II	4Q FY94
TECHEVAL	1Q FY98
MS IIIA	4Q FY98
OPEVAL	1Q FY99
MS IIIB	4Q FY99

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FY 1992/93 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0603609N Budget Activity: 4
Program Element Title: CONVENTIONAL MUNITIONS

A. (U) RESOURCES: (Dollars in Thousands)

Project Number	Title	FY 1990 Actual	FY 1991 Estimate	FY 1992 Estimate	FY 1993 Estimate	To Comp.	Total Prog.
S0363	Insensitive Munitions Advanced Development	12,999	21,558	22,499	26,228	Cont.	Cont.
S1821	Conventional Fuze/Warhead Package	34,654	31,442	20,669	14,216	Cont.	Cont.
		47,653	53,000	43,168	40,444	Cont.	Cont.

B. (U) DESCRIPTION: Insensitive Munitions (IM) (Project S0363): Most Navy munitions react violently when exposed to unplanned stimuli such as fire, shock and bullet impact, thus presenting a great hazard to ships, aircraft, and personnel. This program will provide, validate and transition technology to enable production of munitions insensitive to unplanned stimuli with no reduction to combat performance.

(U) Conventional Fuze/Warhead Package (Project S1821): The Navy requires improved lethality of air and surface launched ordnance to defeat advanced threats. Current specific requirements and initiatives to address them include: the ability to defeat anti-ship missiles attacking at extremely low altitudes by improving SPARROW Missile to defeat existing and near-term low-altitude targets; improve Sparrow Missile through the Missile Homing Improvement Program (MHIP) to counter deceptive countermeasures; demonstrate advanced missile fuzing systems to defeat extremely low-altitude targets by combining Dual Mode RF/IR Fuze and advanced fuzing to defeat reduced observable targets. This project will, in future years, also provide the vehicle to address emergent requirements by transitioning mature fuze and warhead technology from conceptual developments to engineering development with minimum technical and financial risk.

FY 1992/93 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0603609N Budget Activity: 4
Program Element Title: CONVENTIONAL MUNITIONS
Project Number: S0363 Project Title: Insensitive Mun. Adv. Dev.

A. (U) RESOURCES: (Dollars in Thousands)

Project Number	Title	FY 1990 Actual	FY 1991 Estimate	FY 1992 Estimate	FY 1993 Estimate	To Comp.	Total Prog.
S0363	Insensitive Munitions Advanced Development	12,999	21,558	22,449	26,228	Cont.	Cont.

B. (U) DESCRIPTION: Most Navy munitions react violently when exposed to unplanned stimuli such as fire, shock and bullet impact; thus presenting a great hazard to ships, aircraft, and personnel. This program will provide, validate and transition technology to all new weapon developments, and priority weapon systems and enable production of munitions insensitive to these stimuli with no reduction in combat performance. The IM Advanced Development program is the Navy's focused effort on propellants, propulsion units, explosives, warheads, fuzes, and pyrotechnics to reduce the severity of cook-off and bullet/fragment impact reactions, minimizing the probability for sympathetic detonation both in normal storage and in use, increasing ship survivability and satisfying performance and readiness requirements. Each technology area is divided into sub tasks addressing specific munition/munition class IM deficiencies. Energetic materials producibility is demonstrated to assure national capability to produce and load munitions systems. The program is being closely coordinated with other Military Departments, NATO and allied countries to eliminate redundant efforts and maximize efficiency. A joint Service IM requirement has been developed. Insensitive munitions are identified as a DOD critical technology requirement.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

a. (U) Continued validation and shortfall analysis of Weapon Plan of Action and Milestones (POA&Ms).

b. (U) Completed large-scale testing of baseline propellants; and transitioned sympathetic detonation resistant explosive for pilot plant work.

c. (U) Initiated large-scale testing of advanced warhead case concepts (reactive case, composite, dual-explosive); evaluation of alternate propulsion concepts; and design of insensitive fuze boosters.

d. (U) Continued transition of IM technology to weapon developers.

2. (U) FY 1991 Program:

a. (U) Continue validation and shortfall analysis of weapon POA&Ms; continue large-scale testing of sympathetic detonation resistant explosive and metal accelerating explosives; and begin qualification and scale-up of new IM minimum smoke propellant formulations.

Program Element: 0603609N Budget Activity: 4
Program Element Title: CONVENTIONAL MUNITIONS
Project Number: S0363 Project Title: Insensitive Mun. Adv. Dev.

b. (U) Demonstrate advanced initiation systems.

c. (U) Complete vulnerability tests on advanced propulsion concepts, demonstration of initial reactive case, composite and dual explosive warhead design concepts, and design of generic container.

3. (U) FY 1992 Plans:

a. (U) Continue validation and shortfall analysis of weapon POA&Ms, and select explosive candidate for general purpose bomb product improvement.

b. (U) Continue development of high performance metal accelerating explosives for fragmentation, shaped charges and submunitions.

c. (U) Perform large-scale hazard tests of advanced propellants and advanced case designs, and conduct full scale testing of IMAD warhead designs.

d. (U) Complete and document study of advanced case concepts and design method; and complete continuous explosive processing studies.

e. (U) Evaluate new/improved barrier and dunnage materials for packaging, design and fabricate generic containers.

4. (U) FY 1993 Plans:

a. (U) Continue validation and analysis of POA&Ms; large scale advanced propellants vulnerability tests; and full scale testing of ordnance items.

b. (U) Begin development of insensitive high-energy cruise missile booster propellant and rocket motor.

c. (U) Initiate development of high bubble energy underwater explosive for torpedo application.

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN HOUSE: NSWC/Dahlgren, VA; NWC/China Lake, CA; DTNSRDC Annapolis MD; NWSC Crane IN; NOS Indian Head, MD.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: None.

2. (U) SCHEDULE CHANGES: None.

3. (U) COST CHANGES: None.

F. (U) PROGRAM DOCUMENTATION: Non-acquisition Program Decision Document - 13

Program Element: 0603609N Budget Activity 4
Program Element Title: CONVENTIONAL MUNITION
Project Number: S0363 Project Title: Insensitive Mun. Adv. Dev.

March 1986 (update provided to OPNAV January 1990)

G. (U) RELATED ACTIVITIES: PE 0601153N (Defense Research Sciences (energetic materials research)), PE 0602111N (AAW/ASUW Technology), PE 0602315N (Mine and Special Warfare), and PE 0603262N (Aircraft Ordnance and Safety), PE 0604602N (Naval Gunnery Improvement LOVA -76mm and 5"/54. Cooperative technology transfer efforts with all weapons project offices are in progress. Close liaison is maintained with PE 0603514N (Shipboard Damage Control Program).

H. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NATO AC/310 SG I

J. (U) MILESTONE SCHEDULE

	Transition to Eng. Development	Date
1.	Reactive case warhead	FY 1991 (2nd Qtr)
2.	High performance explosive for shaped charge warheads	FY 1991 (4th Qtr)
3.	Container/barrier designs	FY 1991 (4th Qtr)
4.	Sympathetic detonation resistant explosive for large missile warheads and GP-bombs	FY 1992 (3rd Qtr)
5.	Composite and armored warheads	FY 1992 (4th Qtr)
6.	Insensitive rocket motor concept	FY 1992 (4th Qtr)
7.	Explosive identification for ABF	FY 1992 (3rd Qtr)
8.	High output insensitive boosters for missile warheads	FY 1992 (4th Qtr)
9.	New fuzing/detonator concept	FY 1992 (4th Qtr)
10.	Insensitive low signature propellant	FY 1992 (4th Qtr)
11.	Continuous processing/ injection loading techniques	FY 1992 (4th Qtr)
12.	Improved air blast explosive and radial booster	FY 1993 (4th Qtr)
13.	Insensitive motor case design	FY 1993 (4th Qtr)
14.	Alternate propulsion design concepts	FY 1993 (4th Qtr)
15.	Insensitive booster propellants	FY 1994 (4th Qtr)
16.	Insensitive underwater explosive	FY 1995 (1st Qtr)
17.	Insensitive metal accelerating explosive	

FY 1992/93 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0603609N Budget Activity: 4
Program Element Title: CONVENTIONAL MUNITIONS
Project Number: S1821 Project Title: Conventional Fuze/WH Package

A. (U) RESOURCES: (Dollars in Thousands)

Project Number	Title	FY 1990 Actual	FY 1991 Estimate	FY 1992 Estimate	FY 1993 Estimate	To Comp.	Total Prog.
S1821	Conventional Fuze/Warhead Package	34,654	31,442	20,669	14,216	Cont.	Cont.

B. (U) DESCRIPTION: The Navy requires improved lethality of air and surface launched ordnance to defeat advanced threats. Current requirements include the ability to defeat anti-ship missiles attacking at extremely low altitudes. This project improves SPARROW missile by combining Dual Mode RF/IR Fuze (MHIP) and low observable fuze to defeat existing and near-term low-altitude targets. This project will, in future years, also provide the vehicle to address emergent requirements by transitioning mature fuze and warhead technology from conceptual developments to engineering development with minimum technical and financial risks.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

a. (U) SPARROW LOW ALTITUDE PIP SUBPROJECT: JUNE 1990 IOC. PROJECT COMPLETED.
b. (U) ADVANCED THREAT MISSILE FUZE SUBPROJECT: Fabricated three brassboards and conducted tests and analysis of performance.
c. (U) MULTI-FUNCTION PROJECTILE FUZE SUBPROJECT: Completed fabrication and evaluated ten advanced development test units.
d. /

2. (U) FY 1991 Program:

a. (U) ADVANCED THREAT MISSILE FUZE SUBPROJECT: Fabricate second generation brassboards and conduct tests and analysis of performance.
b. (U) MULTI-FUNCTION PROJECTILE FUZE SUBPROJECT:Fabricate sixty advanced development test units.
c. ( ) SPARROW MISSILE HOMING IMPROVEMENT PROGRAM (MHIP) SUBPROJECT: /

3. (U) FY 1992 Plans:
a. (U) ADVANCED THREAT MISSILE FUZE SUBPROJECT: Conduct Captive Carry Tests of fuze.

Program Element: 0603609N Budget Activity: 4
Program Element Title: CONVENTIONAL MUNITIONS
Project Number: S1821 Project Title: Conventional Fuze/WD Package

b. (U) MULTI-FUNCTION PROJECTILE FUZE SUBPROJECT: Evaluate 60 units and fabricate next 70 units.

c. ( )

4. (U) FY 1993 Plans:

a. ( ) ADVANCED THREAT MISSILE FUZE SUBPROJECT: Complete analysis of captive carry test results and

b. ( ) MULTI-FUNCTION PROJECTILE FUZE SUBPROJECT: Complete production of 200 test fuzes and

c. ( )

d. (U) LETHALITY ENHANCEMENT BY DETONATION OF UNEXPENDED FUEL: Assign lead activity and initiate design process.

e. (U) NEW INITIATIVES TO MEET EMERGING REQUIREMENTS: Initiate, develop and evaluate specific advanced development projects as required to enhance lethality and safety of air and surface target ordnance.

5. (U) Program to Completion:

a. ( ) SPARROW MISSILE HOMING IMPROVEMENT PROGRAM (MHIP)

b. (U) LETHALITY ENHANCEMENT BY DETONATION OF UNEXPENDED FUEL SUBPROJECT: Design, fabricate and evaluate advanced development models for availability for transition to FSED in FY 1997.

D. (U) WORK PERFORMED BY: IN HOUSE: Naval Weapons Center, China Lake, CA; Naval Surface Warfare Center, Dahlgren, VA; Pacific Missile Test Center, Pt. Mugu, CA. CONTRACTORS: Raytheon, Lowell, MA; Motorola, Scottsdale, AZ; General Dynamics, Pomona, CA. IRISS (Joint venture of Raytheon and General Dynamics)

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET

1. (U) TECHNOLOGY CHANGES: Not Applicable.
2. (U) SCHEDULE CHANGES: Not Applicable.
3. (U) COST CHANGES: The FY 90 budget is increased $3,573K to complete SPARROW PIP program.

F. (U) PROGRAM DOCUMENTATION

PMP	17 July 1989
TEMP M159-5	COTF Reviewing
MHIP AP SEA 89-02/88-28	Approved 22 Sep 89

Program Element: 0603609N Budget Activity: 4
Program Element Title: CONVENTIONAL MUNITIONS
Project Number: S1821 Project Title: Conventional Fuze/WD Package

G. (U) RELATED ACTIVITIES: Sparrow missile modifications, RIM, 7M WPN (P.E. 0204229N). Standard Missile Improvements, Block IIIB MHIP (P.E. 0604366N) fully describes the common milestones for this joint program that adds a common seeker to both Standard Missile and Sparrow Missile.

	FY 1990 Actual	FY 1991 Estimate	FY 1992 Estimate	FY 1993 Estimate	To Comp.	Total Prog.
(U) Procurement						
WPN SPARROW MODS	0	30,090	34,000	87,900	Cont.	Cont.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable

J. ( ) MILESTONE SCHEDULE

EVENT	DATE
Sparrow Missile Low Altitude PIP IOC	
Sparrow Missile Homing Improvement Program CDR	
Sparrow Missile Homing Improvement Program MS IIIA	
Sparrow Missile Homing Improvement Program ARB	
Sparrow Missile Homing Improvement Program IOC	

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603610N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Advanced Warhead Development
PROJECT NUMBER: S1873 **PROJECT TITLE:** Advanced Warhead Development

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TOTAL PROGRAM
S1873	Advanced Warhead Development	4,593	5,127	6,640	8,526	Continuing

B. ( ) DESCRIPTION: Program improves the MK 50 Torpedo to ensure that it retains an advantage over the evolving Soviet submarine threat. Program includes warhead propulsion (including Advanced Stored Chemical Energy Propulsion System (ADSCEPS)), guidance and control (G&C), computer software, and electronic circuitry (including Very High Speed Integrated Circuit (VHSIC)) technology improvements.

C. ( ) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. ( ) FY 1990 Accomplishments:
   a. ( ) Begin warhead hardware development.
   b. (U) Begin G&C, computer software, and propulsion developments.
   c. (U) Complete analysis of warhead-target coupling and lethality.
   d. (U) Begin MK 50 P^3I trade-off study FY 91.
2. ( ) FY 1991 Program:
   a. ( ) Continue warhead development.
   b. (U) Continue G&C, computer software, and propulsion development.
   c. (U) Complete P^3I trade-off study.
3. ( ) FY 1992 Plans:
   a. ( ) Continue development.
   b. (U) Continue G&C, computer software, and propulsion developments.
4. ( ) FY 1993 Plans:
   a. ( ) Complete development (begin production in FY 94).
   b. (U) Continue G&C, computer software, and propulsion developments.
5. ( ) Program to Completion:
   a. ( ) Begin warhead development and production.
   b. (U) Complete G&C, computer software, and propulsion developments and start production.

D. (U) WORK PERFORMED BY: In-House: NSWC, White Oak, Silver Spring, MD; NOSC, San Diego, CA. Contractors: None.

E. (U) RELATED ACTIVITIES: PE 0604610N (MK 50 Torpedo): FSD for MK 50 Torpedo; PE 0602633N (Technology Development): New underwater warhead concepts; PE 0603792N, ATD: G&C, warhead, and propulsion technologies.

F. (U) OTHER APPROPRIATION FUNDS: Not applicable.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603611M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Assault Vehicle (Advanced)

PICTURE NOT AVAILABLE

A. (U) **RESOURCES:** (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY1991 ESTIMATE	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C0020	AAA	4,611	17,778	67,884	55,279	CONT.	CONT.
C1293	SCRE	13,387	16,171	12,024	18,758	17,686	126,811
C2107a	Small Cal EM Launcher Gun						
		0	0	0	0	5,324	5,324
	TOTAL:	17,998	33,949	79,908	74,037	CONT.	CONT.

a. Program discussed in Program Element 0603640M, project number C2080, Weaponry.

B. (U) **DESCRIPTION:** The Advanced Amphibious Assault (AAA) Program will design, develop, produce, and field a successor to the Marine Corps' current amphibian, the AAV7A1. The AAA will provide the Marine Corps with over-the-horizon forcible-entry amphibious capability as well as the requisite survivability, firepower, and mobility to support operations ashore for the year 2000 and beyond. The Stratified Charge Rotary Engine (SCRE) is a Congressionally mandated development project for a lightweight/low volume, high horsepower engine for combat vehicles and other DoD applications. The SCRE is a candidate engine for the AAA program.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603611M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Assault Vehicle (Advanced)
PROJECT NUMBER: C0020 **PROJECT TITLE:** Advanced Amphibious Assault (AAA)

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993
Program Milestones		MS-I May FY91		
Engineering Milestones		Conceptual Mockups		
T&E Milestones				
Contract Milestones	Concept Exploration Awd 2nd Qtr FY90		Demo/ Validation Awd 1st Qtr	

Budget (K)	FY 1990	FY 1991	FY 1992	FY 1993	Program Total
Major Contract	2,100	14,484	63,170	50,000	Continuing
Support Contract	936	970	950	1,200	Continuing
In-House Support	555	2,324	2,370	2,826	Continuing
GFE/ Other	1,020	0	1,230	500	Continuing
TOTAL	4,611	17,778	67,720	54,526	

B. (U) DESCRIPTION: Qualitative and quantitative improvements in equipment and forces of nations determined to be the most likely threats to U.S. national interests have caused severe deficiencies in the Marine Corps' current assault amphibian, the AAV7A1. Significant improvements in the areas of offensive firepower, armor protection, water and land speed, cross country mobility, and overall crew and system survivability will be the main objectives during this design and development program for a replacement of the AAV7A1. The AAA will eliminate multiple mission area deficiencies in the ship-to-shore movement phase of the amphibious assault and during subsequent combat operations ashore.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603611M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Assault Vehicle (Advanced)
PROJECT NUMBER: C0020 **PROJECT TITLE:** Advanced Amphibious Assault (AAA)

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

a. (U) Received favorable Deputy Secretary of Defense Program Decision Memorandum.

b. (U) Received Favorable Under Secretary of Defense for Acquisition, Acquisition Decision Memorandum.

c. (U) Transitioned Milestone 0.

d. (U) Awarded Conceptual Study Contracts for System Alternatives.

e. (U) Completed Cost Operational Effectiveness Analysis (COEA).

f. (U) All other draft Program Documentation completed for Milestone I.

g. (U) Defense Intelligence Agency (DIA) validated threat update.

h. (U) Milestone I Review Scheduled for May 1991.

1. (U) FY 1990 Accomplishments:

a. (U) Conceptual study contracts awarded.

b. (U) DIA validated threat update.

2. (U) FY 1991 Program: AAA Program efforts during FY 1991 encompasses a number of major areas. They are: planning, preparation, and conduct of Pre-Defense Acquisition Board Milestone I Review briefings such as, the Acquisition Review Board (ARB), Marine Corps, ASN Staff and Navy Acquisition Executive and Defense Acquisition Executive Pre-Briefs, Marine Corps Program Decision Meeting (MCPDM), Component Staff Briefings and the Conventional Systems Committee Review; completion of the Concept Demonstration/Validation (CD/V) Phase request for Proposals (RFP); Management of AAA Conceptual Design Contracts, government verification testing of Concept Exploration/Definition (CE/D) phase deliverables, review of Contract Data Deliverables and attendance at bi-monthly Program Reviews; completion of contractor AAA conceptual design studies; technical evaluation of contractor final conceptual design study reports; conduct of the source selection process for the CD/V phase; conduct of the Defense Acquisition Board (DAB) Milestone I Review.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603611M **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Marine Corps Assault Vehicle (Advanced)
PROJECT NUMBER: C0020 **PROJECT TITLE:** Advanced Amphibious Assault (AAA)

3. (U) FY 1992 Plans: During FY 1992, two cost plus fixed fee type contracts will be awarded for the Concept Demonstration/Validation Phase for the design, fabrication, DT-I test and OT-I evaluation by Marine Corps Operational Testing and Evaluation (MCOTEA) of one AAA prototype vehicle per contractor. Major emphasis on the part of each contractor will be placed toward engineering design and engineering and logistic supportability analyses to finalize their AAA baseline prototype designs. The designs must be to a level that will support procurement of the major portion of prototype materials, subsystems, components and Test Support Kit spare/repair parts required to support prototype fabrication and their subsequent testing during FY 1995/6. The design and construction of an automotive test rig (ATR) by each contractor will be initiated. Contract monitoring, review/comment and response to numerous contractor data deliverables and attendance at contractor(s) In Progress Reviews will be an on-going process.

4. (U) FY 1993 Plans: During FY 1993 the contractors will continue the Engineering Design, Pre-planned Product Improvement (P3I)panning/design, Producibility Planning and Program Management. The contractor will also commence fabrication of the AAAV(P) prototype, complete fabrication of the initial ATR (land only) and procure AAAV(P) prototype and ATR materials. The contractor will continue to mature Test Planning to include subsystem test and commence ATR mobility test. ILS/RAM-D/HARDMAN analysis will continue throughout the fiscal year. The government will continue to monitor and review contractor progress, commence T&E Facilitization and Instrumentation Planning and Procurement, and commence GFE armament and amminition procurement.

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: DRPM AAA,WASH, DC. CONTRACTORS: (CE Phase) FMC, San Jose', CA; (CD/V Phase) General Dynamics Land Division, Detroit, MI; TBD.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603611M **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Marine Corps Assault Vehicle (Advanced)
PROJECT NUMBER: C0020 **PROJECT TITLE:** Advanced Amphibious Assault (AAA)

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) Technology Changes: NONE.

2. (U) Schedule Changes: Total 14 month delay. FY 1991 congressional $8.0 million budget reduction resulted in an additional eight (8) month extension of the CD/V phase.

3. (U) Cost Changes: NONE.

F. (U) PROGRAM DOCUMENTATION:

a.	Mission Area Analysis	December	1987
b.	Mission Need Statement	April	1988
c.	Life Cycle Cost Estimate	May	1988
d.	Program Decision Meeting	July	1988
e.	Acquisition Decision Memorandum	August	1988
f.	System Threat Assessment Report	December	1990
h.	Life Cycle Cost Estimate	February	1990
i.	Cost and Operational Effectiveness Analysis	February	1990
j.	Test and Evaluation Master Plan	February	1990
k.	Integrated Program Summary	February	1990

G. (U) RELATED ACTIVITIES: Project C1293 (Stratified Charge Rotary Engine - SCRE) under this Program Element is related.

H. (U) OTHER APPROPRIATION FUNDS: None. First procurement funding requirements scheduled for FY 1999.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

J. MILESTONES SCHEDULE: NONE.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603611M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Assault Vehicle (Advanced)
PROJECT NUMBER: C1293 PROJECT TITLE: Stratified Charge Rotary Engine (SCRE)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY1991 ESTIMATE	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C1293	SCRE	13,387	16,171	12,024	18,758	17,686	126,811

B. (U) DESCRIPTION: To operate and survive in future threat environments, amphibious and combat vehicles must feature greater mobility, requiring higher output engines. Due to its inherently high power-to-weight/volume ratio, the SCRE offers significant increases in power without significant weight and volume penalties. It will also have fewer parts and utilize a wider range of fuels for potential reduction in the logistics burden and life cycle costs, and will have other potential applications, e.g., generator sets. Recognizing these capabilities, the Congress has mandated the development of the rotary engine as a national asset.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS: Initial Demonstration and Validation (D&V) contract completed during FY 1989. Designed, fabricated and tested nine two-rotor 750 horsepower engines. New contract awarded for D&V effort for a Family of Engines (FOE). Effort includes design, fabrication and testing of five two-rotor and five three-rotor engines and will be completed by the end of FY 1991. Contract for Full Scale Development (FSD) will be awarded during FY 1991. FSD will refine FOE concept and provide engines for extensive performance, reliability, maintainability, durability and application testing.

1. (U) FY 1990 Accomplishments:

a. (U) Completed design of two-rotor and three-rotor engines.

b. (U) Placed purchase orders for engine components. Assembly of engines began in 4th Quarter FY 1990.

c. (U) Initiated integration effort to install a two-rotor SCRE in an Assault Amphibious Vehicle-7A1 (AAV7A1) for application testing.

2. (U) FY 1991 Program:

a. (U) Complete assembly of all two-rotor and three-rotor FOE engines.

b. (U) Conduct laboratory performance, environmental, reliability and durability testing of FOE engines.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603611M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Assault Vehicle (Advanced)
PROJECT NUMBER: C1293 PROJECT TITLE: Stratified Charge Rotary Engine (SCRE)

c. (U) Complete design and order components for SCRE integration in AAV7A1.

3. (U) FY 1992 Plans:

a. (U) Award FSD contract for SCRE. Initiate final design of FOE engines to correct any deficiencies noted during D&V testing.

b. (U) Order components for engine assembly.

c. (U) Complete integration of SCRE in AAV7A1 and conduct application testing.

4. (U) FY 1993 Plans:

a. (U) Conduct laboratory environmental, performance, reliability and durability testing on FOE engines.

b. (U) Initiate installation of FOE engines into tracked vehicle platforms for Developmental and Operational Testing (DT/OT).

5. (U) Program to Completion: This is a continuing program. SCRE production will be dependent upon its selection as a power plant for a host vehicle, such as the Advanced Assault Amphibian.

D. (U) WORK PERFORMED BY: IN-HOUSE: David Taylor Research Center (DTRC), Annapolis, MD. CONTRACTORS: John Deere Technologies Incorporated (JDTI), Woodridge, NJ

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: N/A

2. (U) SCHEDULE CHANGES: N/A

3. (U) COST CHANGES: N/A

F. (U) PROGRAM DOCUMENTATION:

A. Initial Development and Validation Contract completed FY 1989

G. (U) RELATED ACTIVITIES: NONE.

H. (U) OTHER APPROPRIATION FUNDS: NONE.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603611M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Assault Vehicle (Advanced)
PROJECT NUMBER: C1293 PROJECT TITLE: Stratified Charge Rotary Engine (SCRE)

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

J. (U) MILESTONE SCHEDULE:

A.	RFP	2nd Quarter FY 1991
B.	MCPDM II	1st Quarter 1992
C.	Contract Award	1st Quarter 1992

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603612M **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Marine Corps Mine/Countermine Systems (Advanced)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY1991 ESTIMATE	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C0077	Mine/Warfare	1,815	1,165	0	0	0	2,980
C1968	Mine Detection System	5,438	0	0	0	0	5,438
C2029	Joint Directed Energy	2,078	0	0	0	0	2,078
C2106	DEMNS	0	0	0	3,761	6,110	9,747
C2120	AMDAS	0	0	0	10,961	26,927	34,497
	TOTAL:	9,331	1,165	0	14,722	32,725	62,340

B. (U) DESCRIPTION: This program element includes a variety of present and emerging technologies which are projected to contribute to Marine Corps Mine/Countermine systems capability. Focusing on countermine efforts, this program element will specifically develop systems which will detect or neutralize mines. This program element will receive projects from Advanced Technology Transfer Demonstrations PEN 0603640M (C2078 MINE NEUTRALIZATION and C2079 STANDOFF MINE DETECTION). While effectiveness against all types of mines is desirable, the achievement of such a feat has proven itself to be an elusive goal. The dynamic nature and complexity of the countermine problem and its relative urgency necessitate that the Marine Corps consider the advanced development of a variety of systems which will each contribute to achieving overall countermine effectiveness.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603612M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Mine/Countermine Systems (Advanced)
PROJECT NUMBER: C0077 PROJECT TITLE: Mine/Warefare (Advanced)

C. (U) DESCRIPTION: This project will develop an alternative fuel air explosive (FAE) to replace the liquid propylene oxide FAE currently used in the projectile component of the Catapult Launched Fuel Air Explosive (CATFAE) Surf Zone Mine Clearing system. The project includes testing of candidate FAE materials and integration of the selected fuel into the CATFAE projectile to ultimately reduce shipboard safety and storage concerns associated with CATFAE while maintaining desired system effectiveness.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Initiated Advanced Technology Transfer Demonstration (ATTD).

2. (U) FY 1991 Program: Analysis and evaluation of available data on candidate FAE materials. Selection of preferred alternative FAE material. Program terminated.

3. (U) FY 1992 Plans: Program terminated.

E. (U) WORK PERFORMED BY: IN-HOUSE: NCSC, Panama City, FL; NWC, China Lake, CA. CONTRACTORS: TBD.

F. (U) RELATED ACTIVITIES: Program Element 0604612 Surf Zone Mine Clearing (CATFAE) (C1970)

G. (U) OTHER APPROPRIATION FUNDS: NONE.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603612M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Mine/Countermine Systems (Advanced)
PROJECT NUMBER: C2106 **PROJECT TITLE:** Distributed Explosive Mine Neutralization System (DEMNS)

C. (U) **DESCRIPTION:** This project will demonstrate explosive, mechanical and electronical technologies and concepts for neutralizing advanced and hardened threat mines, as well as, wide area, standoff type mines.

D. (U) **PROGRAM ACCOMPLISHMENTS AND PLANS:**

1. (U) **FY** 1990 Accomplishments: Program contained in Program Element 0603640M, Project Number C2078.

2. (U) **FY** 1991 Program: Program contained in Program Element 0603640M, Project Number C2078.

3. (U) **FY** 1992 Plans: Program contained in Program Element 0603640M, Project Number C2078.

4. (U) **FY** 1993 Plans: Complete Milestone I requirements. Conduct Preliminary Design Review. Complete Advanced Technology Transfer Demonstrations (ATTD) approval.

5. (U) Program to Completion: Completes in FY 1996.

E. (U) **WORK PERFORMED BY:** IN-HOUSE: BRADC, Ft Belvior, Va. CONTRACTORS: TBD.

F. (U) **RELATED ACTIVITIES:** US Army Explosive Mine System ATTDS.

G. (U) **OTHER APPROPRIATION FUNDS:** NONE.

H. (U) **INTERNATIONAL COOPERATIVE AGREEMENTS:** NONE.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603612M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Mine/Countermine Systems (Advanced)
PROJECT NUMBER: C2120 PROJECT TITLE: AMDAS

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C2120	AMDAS	0	0	0	10,810	26,687	37,497

B. (U) DESCRIPTION: This program will validate the system concepts that address the Marine Corps Standoff Mine/Minefield Detection requirements supporting Over the Horizon (OTH) Amphibious Assault Operations. The program will be driven by technical constraints placed on it by the need for real time, high speed operations in the very shallow water, surf zone, beach and landing zones. Airborne operations will be demonstrated in an operational context and environment. This program has three sub components: 1) the airborne imaging and data transmission subsystem, 2) the host vehicle, and 3) the base station. The Model will be built to demonstrate that a compact system can be built and deployed from a Marine Corps platform, and to reduce the technical risks in transition to full Demonstration/ Validation Phase. The Advanced Technology Transfer Demonstration (ATTD) will display a prototype Airborne Mine Detection and Survey System (AMDAS) flown from an AV-8B Harrier aircraft in a simulated tactical environment.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Transitioned Airborne Mine Detection and Surveillance (AMDAS) program to ATTD. Completed AMDAS trade-off analysis, designs of airborne imaging and data handling subsystems and base station. Initiated laser, receiver, and design scanner. Funds are contained in project C0077 of this program element.

2. (U) FY 1991 Program: At congressional direction, FY 1991 funds are contained in P.E. 0604373N, Project W2047, Airborne Mine Countermeasures, including $5.0 million for a classified program. Congress directed OSD in FY 1991 to choose between the AMDAS and Magic Lantern technologies for the Navy/Marine Corps mine detection. FY 1991 funds were placed in a joint Navy/Marine Corpos Assessment Program, focused on the Amphibious Minefield Reconnaissance mission. Technical issues are image processing, algorithms, detection probability, false alarm rate, sensor characteristics, and threat/environment effects to include clutter and countermeasures, and optics. Program includes image processing development, assessment, concept, modeling studies and test bed calibration. Technologies investigated include laser, camera and optics.

3. (U) FY 1992 Plans: FY 1992 funds are currently displayed in Program Element 0603640M, Project C2079, Airborne Mine Detection and Surveillance. Test off-the-shelf laser, camera, and optics. Select technologies for risk reduction and conceptual design trade-offs. Complete development and evaluation of performance mode. Prepare Non-Acquisition Program Definition Document for SOMD-Ground ATTD. Continue evaluation of image processing algorithms.

PROGRAM ELEMENT: 0603612M **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Marine Corps Mine/Countermine Systems (Advanced)
PROJECT NUMBER: C2120 **PROJECT TITLE:** AMDAS

4. (U) FY 1993 Plans: Conduct OT to include clutter and threat countermeasures. Complete technology and risk assessment and recommend system for MS I. Transition to D&V. Initiate ATTD for SOMD-Ground.
5. (U) Program to Completion: Completes in FY 1995.

D. (U) WORK PERFORMED BY: In-house: Naval Coastal System Center, Panama City, FL: Lawrence Livermore National Laboratory, Livermore, CA; Department of Energy, Las Vegas, NV; University of Washington, Seattle, WA. CONTRACTORS: TBD.

E. (U) COMPARISION WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Magic Lantern Technology has been integrated into technical approach.
2. (U) SCHEDULE CHANGES: MS I - slipped two quarters, due to program restructuring.
3. (U) COST CHANGES: None.

F. (U) PROGRAM DOCUMENTATION: Joint Operational Requirement (JOR) Date: TBD.

G. (U) RELATED ACTIVITIES: US Army Program Element 0603606A, Land Mine Warfare and Barrier Advanced Technology Remote Mine Detection System (monitoring), Airborne Mine Detection and Reconnaisance System (monitoring/joint testing).

H. (U) OTHER APPROPRIATION FUNDS: NONE.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

J. (U) MILESTONE SCHEDULE:

A.	Program Initiation (Restructured)	2nd Qtr FY 1991
B.	Initiate System Concept Study	2nd Qtr FY 1991
C.	Initiate Image Processor Assessment	2nd Qtr FY 1991
D.	Initiate Performance Model Development	2nd Qtr FY 1991
E.	Draft Test Plan	3rd Qtr FY 1991
F.	Test Bed Calibration/checkout	3rd Qtr FY 1991
G.	Test Plan Approval	4th Qtr FY 1991
H.	Technical Reviews	4th Qtr FY 1991
I.	Initiate Initial Testing	1st Qtr FY 1992
J.	Complete Initial Testing	2nd Qtr FY 1992
K.	Complete Performance Model Development	4th Qtr FY 1992
L.	Initiate Final Field Testing	1st Qtr FY 1993
M.	Complete Final Field Testing	2nd Qtr FY 1993
N.	Complete Critical Technology Risk Assessment	2nd Qtr FY 1993
O.	Recommend System Concepts	4th Qtr FY 1993
P.	MS - I	4th Qtr FY 1993
Q.	Transition to Dem/Val Phase	FY 1993

* FY 1992 funds are currently displayed in P.E. 0603640M, project C2079, Airborne Mine Detection and Surveillance.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603634N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Tactical Nuclear Development
PROJECT NUMBER: S0342 **PROJECT TITLE:** Tactical Nuclear Development

A.(U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 90 ACTUAL	FY 91 EST.	FY 92 EST.	FY 93 EST.	TO COMP.	TOTAL PROGRAM
S0342	TNW	13,914	8,629	6,426	7,937	CONT.	CONT.

B.(U) DESCRIPTION (SURVIVABILITY): This project strengthens deterrence and enhances Naval force survivability, especially against the potential cheap kill effect of nuclear electromagnetic pulse (EMP). Projects involve development of interface engineering for nuclear hardening of conventional offensive and defensive weapons systems for surface combatants, nuclear hardness testing of military equipment, development of nuclear effects survivability technology as applicable to the surface fleet, and technical aspects of employing nuclear survivability hardening technology in a marine environment. Provides LEAD SYSCOM support for all Navy/Marine Corps nuclear survivability matters. (WEAPONS): This project also strengthens deterrence, enhances Navy warfighting capabilities, and provides a hedge against foreign nuclear technological surprise through essential modernization of aging Navy and Marine Corps theater nuclear weapons in joint non-strategic programs with the Department of Energy. Projects involve nuclear weapons conception and feasibility determination, developmental interface engineering of weapons and developmental interface engineering of nuclear payloads. It assesses weapons effectiveness and enhances Navy posture throughout the free world.

C.(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1.(U) FY 1990 ACCOMPLISHMENTS:

a.(U) Monitored technical requirements of W82, performed design safety assessment and conducted design review.

b.(U) Performed tradeoff studies, conducted design review and five development tests, updated tech requirements and specs, performed radiation calculations of B61.

c.(U) Conducted 48 development flight tests, updated tech requirements, performed preliminary design review, initiated unauthorized use analysis, evaluated conventional explosive components, began component reliability assessment, performed radiation calculations of B90.

d.(U) Initiated tech effort, reviewed threat and tentative operational requirements, initiated review of off-the-shelf technologies and systems for application on the Air Standoff Advanced Technology Effort.

e.(U) Defined AAW Battle Management area defense and completed battle management force assessments.

f.(U) Successfully completed the first whole-ship at-sea EMP simulation trial of test ship (USS DEYO DDG-989).

g.(U) Commenced planning and integration coordination of NAVSEA/SPAWAR/NAVAIR SYSTEM COMMAND combined tasking for EMP simulation trial of first new-construction combatant (AEGIS cruiser CG-68) in CY-92.

h.(U) Made preliminary selection of thermal radiation resistant coatings after examining weather resistance and durability.

i.(U) Developed EMP hardening package for topside cables and antennas on test ship.

j.(U) Outlined EMP hardening transition for total fleet program covering Hardness Assurance Maintenance Surveillance for nuclear hardened piece parts.

2.(U) FY 1991 PROGRAM:

a.(U) Perform additional tradeoff studies on other B61 mods. Complete developmental flight testing, pre-op safety study, final design review, compatibility control drawings, complete procedures development, complete shipboard radiation work.

b.(U) Define AAW Battle Management offboard assets and evaluate advanced defense systems concepts.

c.(U) Analyze results of USS DEYO EMP Trial. Apply results to development of specifications and standards for EMP hardened ships.

d.(U) Continue detailed test planning for 1992 Cruiser EMP Trial.

e.(U) Continue evaluation of thermal coatings for shipboard suitability.

f.(U) Plan simulated nuclear blast test of surface ship radar equipment.

g.(U) Develop detailed procedures for EMP simulation trial of all weapon systems, navigation, and ancillary equipment topside on a Navy Reserve trial ship (USS PERRY FFG-7). Conduct capability demo (phase 1).

h.(U) Provide nuclear survivability support for C3I facilities.

3.(U) FY 1992 PLANS:

a.(U) Continue B61 Stockpile Improvement Program engineering development with emphasis on other mods, logistics and training issues prior to fleet delivery.

b.(U) Conduct the first at-sea EMP simulation trial of new construction test ship (USS ANZIO CG-68).

c.(U) Establish specifications for shipboard equipment coating protection against nuclear thermal energy.

d.(U) Continue planning for nuclear blast simulation testing of large-scale equipment in coordination with DNA FY-93 desert series tests.

e.(U) Continue development of procurement specifications for nuclear hardened equipment and systems on surface combatants.

4.(U) FY 1993 PLANS:

a.(U) Continue B61 Stockpile Improvement Program.

b.(U) Complete analyzing the results of EMP survivability data from test ship (USS ANZIO CG-68). Apply results to development of new construction Specifications and Standards for EMP hardened ships.

c.(U) Commence detailed planning for follow-on ships EMP trials.

d.(U) Conduct nuclear blast simulation test on large-scale equipment from topside surface combatants.

e.(U) Begin engineering application of USS ANZIO EMP simulation trial results to remainder of CG-47 class ships, and start integrating results into as many other ship classes as possible.

5.(U) PROGRAM TO COMPLETION: This is a continuing program.

D.(U) WORK PERFORMED BY (WEAPONS): IN-HOUSE: NSWC, Silver Spring, MD; NWC, China Lake, CA; NWEF, Alb., NM; DNA, Wash, DC/Alb., NM, NATC, Pax River, MD. CONTRACTORS: None.

(U) WORK PERFORMED BY (SURVIVABILITY): IN-HOUSE: NSWC, Silver Spring, MD/ Dahlgren, VA; NSWSES, Port Hueneme, CA; NRL, Wash, DC; NOSC, San Diego, CA; David Taylor, DTNSRDC, MD; NSSES, Phil, PA; NOS, Louisville, KY; NESEA, St. Indigoes, MD; NUSC, New London, CT; DNA, Wash, DC. CONTRACTORS: Rockwell/ EG&G/ ARC/ ERC, Arlington, VA; S3, San Diego, CA; RDA, Los Angeles, CA; JAYCOR/BDM/EMA, Alb., NM; INGALLS, Pascagoula, MS.

E.( ) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1.(U) TECHNOLOGY CHANGES: Not applicable.

2.( ) SCHEDULE CHANGES: B61-6 and -8 IOCs have slipped to] and _ respectively due to DOE complex production problems.

3.(U) COST CHANGES: Decrease of 5.8M in FY91 is a result of Congressional Language which denied funds for three distinct weapons programs: B90, W82, and Air Standoff.

F.(U) PROGRAM DOCUMENTATION: (1) TACNUC NAPDD #221-TAC98 of 08/11/89
(2) B90 NDB - OR dated 1/88 and DON/DOE MOU dated 6/89.

G.(U) RELATED ACTIVITIES: PE 0204161N, Defense Nuclear Agency (DNA) Spare and Repair Parts and DNA Material; PE 0204162N, Practice Bombs; PE 0604603N, Project W1844, Unguided Conventional Air Launched Weapons; PE 0603514N, Project S1607, EMPRESS II, and Project S0384, Ship Survivability (Advanced). The Tactical Nuclear Development Program has no funds for EMPRESS II which was budgeted separately under PE 0603514N, Project S1607 through FY 90.

H.(U) OTHER APPROPRIATION FUNDS: DOE budgets and funds for their B90 responsibilities in accordance with the DON/DOE MOU. Their costs and budgets are not normally provided to the DOD. An independent cost evaluation (ICE) is currently underway to reevaluate production costs for a fixed inventory objective for B90 Bombs.

I.(U) INTERNATIONAL COOPERATIVE AGREEMENTS (SURVIVABILITY): Germany and Great Britain

J.( ) MILESTONE SCHEDULE:

		DATE
1.	( ) B 61-6 IOC	
2.	( ) B 61-8 IOC	
3.	(U) Conduct Reserve Unit FFG-7 Trial	06/91
4.	(U) Conduct AEGIS cruiser EMP trial	11/92
5.	(U) Blast test of missile director	06/93
6.	(U) EMP Cruiser follow-on trial	06/94

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603635M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Supporting Arms Systems (Advanced)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY1991 ESTIMATE	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C1598	NBC Equipment	2,443	3,071	980	1,800	CONT.	CONT.
C1964	Joint Anti-Armor Weapons Systems	3,409	8,029	1,446	487	CONT.	CONT.
C2112a	Ltwt 155mm Howitzer	0	2,789	0	0	0	0
C2113b	Short Range Anti-Tank Weapon	0	0	6,893	8,451	CONT.	CONT.
	TOTAL	5,852	13,889	9,319	10,738	CONT.	CONT.

a Balanced Technology Initiative funded in Fiscal Years 1990-1993.

b Programs discussed in Program Element 0603640M, Marine Corps Advanced Technology Transfer Demonstrations (ATTD), Project C2080, Weaponry.

B. (U) DESCRIPTION: This program element supports advanced development of Marine Corps Ground/Supporting Arms Systems for utilization in Marine Air-Ground Expeditionary Force amphibious operations.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603635M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Supporting Arms Systems (Advanced)
PROJECT NUMBER: C1598 PROJECT TITLE: Nuclear/Biological/Chemical (NBC) Equipment

C. (U) DESCRIPTION: This program develops NBC Equipment jointly with other services. Marine Corps efforts concentrate on amphibious characteristics involving Detection, Individual/Collective Protection and Decontamination.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Completed evaluation of: Green Vinyl Overshoe (GVO); M272 Water Testing Kit, Chemical Agent Monitor, and M291 Personal Skin Decontamination Kit. Continued development of: Portable Collective Protection System Product Improvement (PCPS PIP); Remote Sensing Chemical Agent Alarm (RSCAAL).

2. (U) FY 1991 Program:

a. (U) Continue development of: PCPS PIP; NBC detector M43A1 PIP; Individual Chemical Agent Detector (ICAD); Lightweight Chemical Biological Protective Suit (LWCBPS); and M40/PIP. Start development of: ICAD PIP; M11 Stretch/ Decontamination System; Lightweight Assault Mask (LWAM); Chemical/Biological Detector (CBD); Foam Decontaminate (FD).

3. (U) FY 1992 Plans: Continue development of: M40/PIP; ICAD/PIP; LWAM; CBD; FD;ECWCBS; CSS; and CPU. Start development of: Aerial Chemical/Biological Detector Agent (ACBD); RSCAAL; and Chemical/Biological Mini Detector (CBMD);

4. (U) FY 1993 Plans: Continue development of CBD; FD; ACBD; RSCAAL; and CBMD. Start development of: Modular Decontamination System (MDS).

5. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MCRDAC, Quantico, VA; US Army NRDEC, Natick, MA; US Army CRDEC, Aberdeen, MD; NSWC, Dahlgren, VA. CONTRACTORS: Environmental Technologies Group, Inc., Baltimore, MD; Brunswick Defense, Deland, FL.

F. (U) RELATED ACTIVITIES: NONE.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

(U) PROCUREMENT	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
NBC EQUIPMENT	32,803	3,633	4,114	5,188	23,236	69,686

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603635M **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Supporting Arms Systems (Advanced)
PROJECT NUMBER: C1964 **PROJECT TITLE:** Joint Anti-Armor Weapons Systems (JAAWS)

C. (U) DESCRIPTION: This project provides for the Marine Corps participation in the Joint Anti-Armor program entitled Advanced Anti-tank Weapon System-Medium (AAWS-M). This unique weapon system will provide the Marine Corps and Army with a state-of-the-art capability to destroy sophisticated and future armored threat. No such medium system is currently available to the infantryman.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: The AAWS-M is now in Full Scale Development and a system Critical Design Review was completed during March 1990.

2. (U) FY 1991 Program: Continue to monitor and participate in the joint development and developmental testing of the AAWS-M.

3. (U) FY 1992 Plans: Continue to monitor and participate in the joint development and operational testing of the AAWS-M. USMC participation in joint DARPA/USA/USMC Anti-Armor program will transfer to Program Element 0603640M, Marine Corps Advanced Technology Transfer Demonstrations (ATTD), Project C2117, Joint Armor/Anti Armor Technology in FY 1992.

4. (U) FY 1993 Plans: Continue to monitor and participate in the joint development and operational testing of the AAWS-M and transition to production.

5. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: US Army MICOM, Redstone Arsenal, AL; NSWC, Dahlgren, VA; NWSC, Crane, IN. CONTRACTORS: Texas Instrument/Martin Marietta team.

F. (U) RELATED ACTIVITIES: Army Armor/Anti-Armor programs for heavy and light systems.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

(U) PROCUREMENT	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
AAWS-M	0	0	3,963	39,639	366,876	410,478

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603635M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Supporting Arms Systems (Advanced)
PROJECT NUMBER: C2112 **PROJECT TITLE:** Lightweight 155mm Howitzer (LW155)

C. (U) **DESCRIPTION:** The LW155 will provide indirect fire support to the Fleet Marine Force with the same firepower capability as the M198 Howitzer but with increased mobility and transportability.

D. (U) **PROGRAM ACCOMPLISHMENTS AND PLANS:**

1. (U) **FY 1990 Accomplishments:** Completed initial evaluation of Lightweight 155 MM technology. Funding was programmed in Program Element 0206623M, project C1901.

2. (U) **FY 1991 Plans:** Program terminated.

E. (U) **COMPARISON WITH REVISED FY 1990/91 PRESIDENT'S BUDGET:**

1. (U) **Technical Changes:** None.

2. (U) **Schedule changes:** Program termination.

3. (U) **Cost changes:** None.

F. (U) **WORK PERFORMED BY:** IN-HOUSE: MCRDAC, Quantico, VA; NSWC, Dahlgren, VA; ARDEC, Picatinney, NJ. CONTRACTORS: NONE.

G. (U) **RELATED ACTIVITIES:** NONE.

H. (U) **OTHER APPROPRIATION FUNDS:** NONE.

I. (U) **INTERNATIONAL COOPERATIVE AGREEMENTS:** NONE.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603635M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Supporting Arms Systems (Advanced)
PROJECT NUMBER: C2113 **PROJECT TITLE:** Short Range Anti-Tank Weapon (SRAW)

C. (U) **DESCRIPTION:** The SRAW will provide the Marine Corps with a lethal, disposable, proliferable, accurate, lightweight, cost effective, tank killer.

D. (U) **PROGRAM ACCOMPLISHMENTS AND PLANS:**

1. (U) FY 1990 Accomplishments:

a. (U) Source Selection completed January 1990.

b. (U) Contracts awarded February 1990. Demonstration/Validation Phase commenced March 1990 with two contractors.

2. (U) FY 1991 Program: Continue Demonstration/Validation Phase.

a. (U) Terminate contract with Hughes Aircraft Company, December 1990, because of use of same technology approach as competitor. Resulted in $2.4 million savings reprogrammed to high priority deficiency.

3. (U) FY 1992 Plans: Continue Demonstration/Validation Phase.

4. (U) FY 1993 Plans:

a. (U) Milestone II first quarter FY 1993.

b. (U) Initiate Full Scale Development.

5. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NSWC Dahlgren, VA; NWC, China Lake, CA. CONTRACTORS: Ford Aerospace Aeronautic Division, Newport Beach, CA.

F. (U) RELATED ACTIVITIES: NONE.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

(U) PROCUREMENT	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
SRAW	0	0	0	0	19,712	265,000

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Draft Memorandum of Understanding (MOU) with the United Kingdom in staffing.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603640M **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Marine Corps Advanced Technology Transfer Demonstration (ATTD)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY1991 ESTIMATE	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C2078	Mine Neutralization	0	2,446	3,800	0	7,354	CONT.
C2079	Standoff Mine Detection	*	**	16,828	3,944	9,054	CONT.
C2080	Weaponry	0	1,019	1,504	7,080	12,549	CONT.
C2081	Battlefield Electronic Support	0	575	1,906	2,218	2,687	CONT.
C2082	Chemical/Biological Defense	0	1,019	2,257	2,059	1,449	CONT.
C2115	Joint Tactical Directed Energy Warfare Technology	0	0	501	2,564	CONT.	CONT.
C2117	Joint Armor/Anti-Armor Technology	0	0	2,508	2,712	CONT.	CONT.
C2118	Advanced Engine Propulsion Technology	0	0	3,511	3,451	6,294	CONT.
	TOTAL	0	5,059	32,815	24,028	CONT.	CONT.

* FY 1990 funded in PE 0603612M, MC Mine Countermeasures, Project C0077.
** FY 1991 funded in PE 0604373N, Airbourne MCM, Project W2047.

B. (U) DESCRIPTION: Critical Marine Corps deficiencies being addressed in this program element are Standoff Mine Detection for application in very shallow water, Surf Zone and Ashore; Mine Neutralization; Chemical/Biological Defense capability for Marine personnel and material; Advanced Infantry and Vehicle Mounted Weapon Systems; and application of computer technology to Battlefield Electronic Support Systems.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603640M **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Marine Corps Advanced Technology Transfer Demonstrations (ATTD)

PROJECT NUMBER: C2078 **PROJECT TITLE:** Mine Neutralization

C. (U) **DESCRIPTION:** This project will demonstrate explosive, mechanical and electronic technologies and concepts for neutralizing advanced and hardened threat mines, as well as, wide area, standoff type mines.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Distributed Explosive Mine Neutralization System (DEMNS): Initiated ATTD. Selected most promising explosive technology. Completed preliminary design of ATTD prototype. Conducted neutralization and deployment sub-systems Preliminary Design Review (PDR). Funded in Program Element 0603612M, Marine Corps Mine/Counter-measures Systems (Advanced), Project C0077, Mine Warfare (Advanced), in FY 1990.

2. (U) FY 1991 Program: DEMNS: Complete DT-0/OT-0 Test Plan and Systems Concept Paper (SCP). Conduct subscale inert and live tests of neutralization and deployment systems. Conduct system Critical Design Review (CDR).

3. (U) FY 1992 Plans: DEMNS: Conduct DT-OT testing. Conduct full scale live system demonstration. Complete transition documentation.

4. (U) FY 1993 Plans: DEMNS: Transition to Demonstration and Validation phase, Project C2106, Program Element 0603612M. Complete Milestone I requirements. Conduct PDR. Wide Area Mine Clearance (WAMC): Complete NAPDD/ATTD approval.

5. (U) Program to Completion: This is a continuous program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NOS Indian Head, MD; BRADC, Ft Belvior, Va. CONTRACTORS: TBD.

F. (U) RELATED ACTIVITIES: US Army Explosive Mine System ATTDs.

G. (U) OTHER APPROPRIATION FUNDS: NONE.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603640M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Advanced Technology Transfer Demonstration (ATTD)
PROJECT NUMBER: C2079 PROJECT TITLE: Standoff Mine Detection (SOMD)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C2079	SMD	5,438 *	#	16,828	3,944	9,054	29,826

* funded in PE 0603612M C1968 # funded in PE 0604373 W2047

B. (U) DESCRIPTION: Demonstrate technologies for Marine Corps Over-the-Horizon Amphibious Assault. Requirements are real time, high speed operations in shallow water, and surf/landing zones. Airborne/ground operations addressed by technical risk. Issues addressed by testing, modeling and analysis. Technical technology concepts demonstrated in operational tests.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Transitioned Airborne Mine Detection and Surveillance (AMDAS) program to ATTD. Completed AMDAS trade-off analysis, designs of airborne imaging and data handling subsystems and base station. Initiated laser, receiver, and design scanner.
2. (U) FY 1991 Program: Congress directed OSD in FY 1991 to choose between the AMDAS and Magic Lantern technologies for the Navy/Marine Corps mine detection. FY 1991 funds were placed in a joint Navy/Marine Corps Mine Detection Laser Technology program. OSD recommended a Joint Technology Risk Assessment Program, focused on the Amphibious Minefield Reconnaissance mission. Technical issues are image processing, algorithms, detection probability, false alarm rate, sensor characteristics, and threat/environment effects to include clutter and countermeasures, and optics. Program includes image processing development, assessment, concept, modeling studies and test bed calibration. Technologies investigated include laser, camera and optics.
3. (U) FY 1992 Plans: Test off-the-shelf laser, camera, and optics. Select technologies for to risk reduction and conceptual design trade-offs. Complete development and evaluation of performance model. Prepare Non-Acquisition Program Definition Document for SOMD-Ground ATTD. Continue evaluation of image processing algorithms.
4. (U) FY 1993 Plans: Conduct in OT to include clutter and threat countermeasures. Complete technology and risk assessment and recommend system for MS I. Transition to D&V. Initiate ATTD for SOMD-Ground.
5. (U) Program to Completion: Completes in FY 1995.

D. (U) WORK PERFORMED BY: IN-HOUSE: Naval Coastal System Center, Panama City, FL; Lawrence Livermore National Laboratory, Livermore, CA; Department of Energy, Las Vegas, NV; University of Washington, Seattle, WA. CONTRACTORS: TBD.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603640M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Advanced Technology Transfer Demonstration (ATTD)
PROJECT NUMBER: C2079 PROJECT TITLE: Standoff Mine Detection

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Magic Lantern Technology has been integrated into technical approach.

2. (U) SCHEDULE CHANGES: MS I - slipped two quarters, due to program restructuring.

3. (U) COST CHANGES: NONE.

F. (U) PROGRAM DOCUMENTATION:

a. Joint Operational Requirement (JOR) Date: TBD.

G. (U) RELATED ACTIVITIES: US Army Program Element 0603606A, Land Mine Warfare and Barrier Advanced Technology Remote Mine Detection System (monitoring), Airborne Mine Detection and Reconnaisance System (monitoring/joint testing).

H. (U) OTHER APPROPRIATION FUNDS: NONE.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE. UNCLASSIFIED

J. (U) MILESTONE SCHEDULE:

A.	Program Initiation (Restructured)	2nd Qtr FY 1991
B.	Initiate System Concept Study	2nd Qtr FY 1991
C.	Initiate Image Processor Assessment	2nd Qtr FY 1991
D.	Initiate Performance Model Development	2nd Qtr FY 1991
E.	Draft Test Plan	3rd Qtr FY 1991
F.	Test Bed Calibration/checkout	3rd Qtr FY 1991
G.	Test Plan Approval	4th Qtr FY 1991
H.	Technical Reviews	4th Qtr FY 1991
I.	Initiate Initial Testing	1st Qtr FY 1992
J.	Complete Initial Testing	2nd Qtr FY 1992
K.	Complete Performance Model Development	4th Qtr FY 1992
L.	Initiate Final Field Testing	1st Qtr FY 1993
M.	Complete Final Field Testing	2nd Qtr FY 1993
N.	Complete Critical Technology Risk Assessment	2nd Qtr FY 1993
O.	Recommend System Concepts	4th Qtr FY 1993
P.	MS - I	4th Qtr FY 1993
Q.	Transition to Dem/Val Phase	1st Qtr FY 1994

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603640M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Advanced Technology Transfer Demonstration (ATTD)
PROJECT NUMBER: C2080 PROJECT TITLE: Weaponry

C. (U) DESCRIPTION: This project will involve several Advanced Technology Transfer Demonstration (ATTD) programs to address Marine Corps future weaponry needs. Substantial increases in firepower cannot be met through conventional weapons systems as they are approaching the theoretical performance limits within the physical limit constraints of weight and volume.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Prepared Non-Acquisition Program Definition Document (NAPDD) for approval for Electro Magnetic Gun (EMG) to start in FY 1991. Conducted Exploratory Development tasks to establish basis for follow-on Advanced Technology Transfer Demonstration (ATTD) under PE 0602131M, Marine Corps Air Ground Technology.

2. (U) FY 1991 Program: Complete initial EMG system design and refine systems design. Conduct system design trade-offs.

3. (U) FY 1992 Plans: Finalize Electro Magnetic Gun (EMG) system design, fabricate prototype system, test fire system in single salvo mode, refine system design. Generate approved Non-ACAT Program Definition Document (NAPDD) for Advanced Lightweight Ground Weaponry (ALGW), Team Target Engagement Simulator (TTES), and Special Purpose Weaponry (SPW) ATTD projects.

4. (U) FY 1993 Plans: Complete EM Gun system, demonstrate salvo shot, and document for transition to P.E. 0603611M in FY 1994. Initiate ATTD for Advanced Lightweight Ground Weaponry (ALGW) and Special Purpose Weaponry (SPW)

5. (U) Program to Completion: This is a continuous program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MCRDAC, Quantico, VA; Army Research Development and Engineering Command (ARDEC), Picatinny Arsenal, N.J.; Naval Weapons Center (NWC), China Lake, CA; Naval Surface Weapons Center (NSWC) Dahlgren, VA. CONTRACTORS: University of Texas, Austin, TX.

F. (U) RELATED ACTIVITIES: Marine Corps Exploratory Development programs in directed energy, fire control, alert and cue, and electric drive (P.E. 0602131M).

G. (U) OTHER APPROPRIATION FUNDS: NONE.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603640M **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Marine Corps Advanced Technology Transfer Demonstration (ATTD)
PROJECT NUMBER: C2081 **PROJECT TITLE:** Battlefield Electronic Support

C. (U) **DESCRIPTION:** This project demonstrates several technologies intended to advance USMC Command Control Communications & Intelligence (C3I) systems from dedicated communications networks and specialized, proprietary computer hardware/software to automated systems using standardized open architectures, which are interoperable with other system C4I systems. Amphibious Assault Networking Technology (AANT) tailors a USN developed, non-dedicated radio net control system for use in Marine Tactical Systems (MTS).

D. (U) **PROGRAM ACCOMPLISHMENTS AND PLANS:**

1. (U) FY 1990 Accomplishments: Both AANT and C2-2000 are 6.2 projects in FY 1990. AANT: Investigate USN Unified Networking Technology (UNT)/MTS interface issues. C2-2000: Develop C2 software. Built USMC test bed.

2. (U) FY 1991 Program: Initiate AANT Advanced Technology Demonstration (ATTD). Assemble USMC AANT node on UNT/Communications Support System (CSS). C2-2000, still in 6.2, continue to develop software and demonstrate concepts in FMF exercises.

3. (U) FY 1992 Plans: Demonstrate AANT gateway and design maneuver element communications node. Initiate C2-2000 ATTD. Modify C2-2000 software and expand capabilities based on FMF field testing.

4. (U) FY 1993 Plans: Demonstrate AANT maneuver element communications node and prepare transition documentation. Continue C2-2000 development/field testing and prepare transition documentation.

5. (U) Program to Completion: This is a continuous program.

E. (U) **WORK PERFORMED BY:** IN-HOUSE: AANT - NOSC, San Diego, CA. C2-2000 - HDL, Adelphi, MD. CONTRACTORS: TBD

F. (U) **RELATED ACTIVITIES:** AANT: Program Element 0603717N, U. S. Navy Command and Control Systems; and Program Element 0206313M, U. S. Marine Corps Telecommunications Systems. AANT is designed to be USMC interface to the Navy UNT program. C2-2000: Program Element 0603717N, U. S. Navy Command and Control Systems; and Program Element 0206626M, U. S. Marine Corps Command, Control and Communications Systems.

G. (U) **OTHER APPROPRIATION FUNDS:** NONE.

H. (U) **INTERNATIONAL COOPERATIVE AGREEMENTS:** NONE.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603640M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Advanced Technology Transfer Demonstration (ATTD)
PROJECT NUMBER: C2082 PROJECT TITLE: Chemical/Biological Defense

C. (U) DESCRIPTION: The High Mobility Purpose Wheeled Vehicle Nuclear Biological Chemical (HMMWV NBC) Reconnaissance System (NBCRS) ATTD will demonstrate advanced technologies for NBC recon, field biological-agent analysis, and disseminating NBC hazard information for expeditionary forces. The Lightweight Protective Suit/Rainwear ATTD will demonstrate protective suit, rainwear and undergarment concepts for Marine Expeditionary Forces. The NBC Aerial Stand Off Detector ATTD will demonstrate a passive IR stand off agent detector and advanced algorithm for agent detection from aircraft or UAV/RPV. Chem/Bio Defense for Amphibious Vehicles will demonstrate new concepts for improved vehicle and crew NBC survivability in Marine Corps unique fighting vehicles.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Prototype Preliminary Design Review completed for the HMMWV NBCRS ATTD and system baseline established for demonstration. HMMWV NBCRS ATTD Operational Test (OT-0) and Development Test (DT-0) planning completed. Hardware integration on HMMWV NBCRS chassis initiated. Non-Acquisition Category Program Definition Documents (NAPDD's) staffed for final approval on Lightweight Protective Suit/Rainwear and Aerial Stand Off Detector ATTD's.

2. (U) FY 1991 Program: HMMWV NBCRS demonstration conducted in a field environment, will validate advanced equipment/doctrinal concepts for USMC NBC recon. Initiate Lightweight Suit/Rainwear and Aerial Stand Off Detector ATTD projects.

3. (U) FY 1992 Plans: HMMWV NBCRS completes field demonstration and finalizes documentation for planned transition in FY 1993.

4. (U) FY 1993 Plans: HMMWV NBCRS ATTD will transition to PE 0605635M; C1598-SL NBC Equipment, for Demonstration and Validation (DEMVAL).

5. (U) Program to Completion: This a continuous program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MCRDAC, Quantico, VA., CRDEC, APG, MD.; NSWC, Dahlgren, VA.; NRDEC, Natick, MASS.; NRL, Wash, DC. CONTRACTORS: Battelle, Columbus, OH; KENROB & Associates, Dahlgren, VA.

F. (U) RELATED ACTIVITIES: US Army, NBCRS (XM93) program and US Army Soldier Integrated Protective Ensemble (SIPE) program. US Navy Foul Weather Gear Product Improvements.

G. (U) OTHER APPROPRIATION FUNDS: NONE.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603640M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Advanced Technology Transfer Demonstration (ATTD)
PROJECT NUMBER: C2115 PROJECT TITLE: Joint TDEW TECH

C. (U) DESCRIPTION: This project is intended to provide USMC participation in joint demonstrations of defensive and offensive directed energy technologies. Tactical Directed Energy Warfare (TDEW) has been classified into three categories: RF energy, lasers, and particle beam technology.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Participation in joint protection technology development. Initial investigations of the vulnerability of the Modular Universal laser Equipment (MULE). Advanced development of improved laser eye and direct-view optics protection. Optical bioeffects model completed. Environmental testing of one hand-held laser completed. Initial characterization of special purpose device. Work accomplished under PE 0603612M, Project C2029 Joint Directed Energy.

2. (U) FY 1991 Program: Support to joint protection technology development and improved individual eye protection. Continue assessment of MULE vulnerability. Design protection for USMC armored combat vehicles (ACV). Join in force-on-force modelling via Counter Target Acquisition System (CTAS). Complete design and demo of special purpose device. Begin initial characterization of anti-air warfare (AAW) systems. (PE 0603612M, Proj C2029)

3. (U) FY 1992 Plans: Support to joint protection technology development. Transition protection technology for MULE to Program Manager (PM) for product improvement. Design protection systems for USMC ACVs. Extend CTAS modelling.

4. (U) FY 1993 Plans: Support of joint protection technology development. Assemble protection systems of USMC ACVs. Continue CTAS modelling and analyses. Design AAW systems and begin assembly.

5. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MCRDAC, Quantico VA; NADC, Warminster PA; NPRDC, San Diego CA; NWC, China Lake CA; CONTRACTORS: TBD.

F. (U) RELATED ACTIVITIES: Improved Protection Technologies, Survivability Management Office PE 0602310E. Counter Target Acquisition System, TRADOC; Advanced LASER Technologies, CECOM. Joint LASER protection technologies, PEs 0602234N, 0602786A, 0602601A, 0602301E

G. (U) OTHER APPROPRIATION FUNDS: NONE.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: N/A

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603640M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Advanced Technology Transfer Demonstration (ATTD)
PROJECT NUMBER: C2117 PROJECT TITLE: Joint Anti-Armor Technology

C. (U) DESCRIPTION: The Joint Armor/Anti-Armor Technology Advanced Technology Program focuses on exploring high risk, innovative technologies or unconventional approaches to armor/anti-armor development. The project addresses the disparity between US and Soviet armor/anti-armor capabilities and provides the USMC with the capability to execute a competitive modernization rate. FY 1990 and FY 1991 efforts were funded in Program Element 0603635M, C1964 Joint Anti-Armor Weapons Systems.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Initiated Phase II Armor Protection Program. Begin Mission Kill Program.

2. (U) FY 1991 Program: Continue development of Phase II light, medium and heavy armors. Investigate alternative material and geometry KE penetrators. Continue Phase II of the Armor Protection Program.

3. (U) FY 1992 Plans: Pursue advanced CE warhead concepts - enhanced wave shaping for improved energy coupling, advanced CE liner materials. Develop advanced concept KE penetrators - alternate geometry penetrators, materials and hypervelocity projectile design. Initiate Phase I of the Mission Kill Program.

4. (U) FY 1993 Plans: Pursue advanced CE warhead concepts - multi-purpose warhead technology, coupled CE and KE lethal mechanisms.

5. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MCRDAC, Quantico, VA; DTRC, Bethesda, MD. CONTRACTORS: GDLS, Warren, MI; DuPont, Newark, DE; KAMAN, Colorado Springs, CO; FMC, San Jose, CA; Foster Miller, Waltham, MA.

F. (U) RELATED ACTIVITIES: Program Element 0603635M, Marine Corps Ground Combat/Support System, Project C1964.

G. (U) OTHER APPROPRIATION FUNDS: NONE.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Advanced Armor Protection System.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603640M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Advanced Technology Transfer Demonstration (ATTD)
PROJECT NUMBER: C2118 **PROJECT TITLE:** Advanced Engine/Propulsion Technology

C. (U) DESCRIPTION: This program will focus on the development and demonstration of alternative engine advanced technology for use in combat vehicles and other equipment that requires an internal combustion engine as a power source. Emphasis will be placed on developing engines that display the following characteristics: high power density, reduced weight, marine environment compatibility, and high fuel efficiency. The program will also develop and demonstrate innovative and advanced propulsion technology which can reduce the currently dictated installed horsepower requirements of USMC Assault Amphibians.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Drafted and submitted for approval non-acquisition (NON-ACAT) Program Definition Document (NAPDD) for Advanced Engine Technology ATTD. Monitored Tech Base Programs for input to ATTD.

2. (U) FY 1991 Program: Transition technology from exploratory development in Tech Base (PE 0602131M).

3. (U) FY 1992 Plans: Draft and submit for approval NAPDD for Advanced Propulsion Technology ATTD. Initiate Advanced Engine Technology ATTD.

4. (U) FY 1993 Plans: Transition technology from Tech Base exploratory development. Initiate Advanced Propulsion Technology ATTD. Install 2200 hp MTU-883 engine into testbed vehicle with electric water drive. Begin installation of Water Piston Propulsor (WPP) into High Water Speed Technology Demonstrator (HWSTD).

5. (U) Program to Completion: Completes in FY 1995.

E. (U) WORK PERFORMED BY: IN-HOUSE: MCRDAC, Quantico, VA; David Taylor Research Center (DTRC), Bethesda, MD; CONTRACTORS: MTU Corp., Friedrichshafen, FRG; Detroit Diesel, Detroit, MI.; Tracor Hydronautics, Laurel, MD; Solar Turbines, San Diego, CA.

F. (U) RELATED ACTIVITIES: Program Element 0603005A, Combat Vehicle and Automotive Advanced Technology, U.S. Army Advanced Integrated Propulsion System (AIPS) program M1A1 tank.

G. (U) OTHER APPROPRIATION FUNDS: NONE.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: N/A.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603654N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Joint Service Explosive Ordnance Disposal Development (Advanced)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0377	Explosive Ordnance Disposal Procedures	4,058	4,829	5,361	6,551	CONT.	CONT.
S1317	Explosive Ordnance Disposal Diving Systems	3,394	4,060	3,170	3,531	CONT.	CONT.
	TOTAL	7,452	8,889	8,531	10,082		

B. (U) DESCRIPTION: Provides for the development of Explosives Ordnance Disposal tools and equipment for use by all military services. The responsibility is assigned to the Navy as single service manager, by Department of Defense Directive 5160.62 of 26 April 1989, for management of the Joint Service Explosive Ordnance Disposal Research and Development Program. Increasing types of foreign and domestic weapons necessitate a continuing development program to provide Explosive Ordnance Disposal personnel of all military services with the special equipment and tools required to support this mission. This program also provides life support related equipment and remotely operated vehicles necessary to support the performance of Navy Explosive Ordnance Disposal tasks underwater. This equipment must have inherently low acoustic and magnetic signatures in order to allow the Explosive Ordnance Disposal technician to safely approach, render safe and dispose of underwater ordnance.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603654N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Joint Service Explosive Ordnance Disposal Dev (Adv)
PROJECT NUMBER: S0377 **PROJECT TITLE:** Explosive Ordnance Disposal Procedures

C. (U) **DESCRIPTION:** Provide Explosive Ordnance Disposal personnel of all military services with the specialized equipment and tools required to support their mission of detection, location, identification, rendering safe, recovery, field and laboratory evaluation, and final disposal of nuclear, conventional, chemical, and biological munitions, including improvised explosive devices.

D. (U) **PROGRAM ACCOMPLISHMENTS AND PLANS:**

1. (U) FY 1990 Accomplishments:
   a. Completed TECHEVAL on Remotely Activated Vehicle for Emplacement and Reconnaissance (ROVER).
   b. Initiated the All Metals Locator.
2. (U) FY 1991 Program:
   a. Approval for Production for ROVER.
   b. Continue development and testing of on-going projects.
3. (U) FY 1992 Plans:
   a. Obtain Approval for Production for Diver Acoustic Positioning System, All Metals Locator and Remote Controlled Reconnaissance Monitor (RECORM).
   b. Initiate Remote Drill and Inject, Water Jet Cutter, and Munition Disrupter.
4. (U) FY 1993 Plans: Continue development and testing of on-going projects.
5. (U) Program to Completion: This is a continuing program.

E. (U) **WORK PERFORMED BY:** IN-HOUSE: Naval EODTC, Indian Head, MD. CONTRACTORS: Foster-Miller Associated, Inc., Waltham, MA; Datasonic, Inc., Cataumet, MA.

F. (U) **RELATED ACTIVITIES:** PE 0604654N, Joint Service Explosive Ordnance Disposal Development (Engineering), provides for the integration of specialized tools and equipment into specified procedures required for individual weapons and ordnance items.

G. (U) **OTHER APPROPRIATION FUNDS:** (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT (OPN) #221	0	2,000	294	975	CONT.	CONT.

H. (U) **INTERNATIONAL COOPERATIVE AGREEMENTS:** None.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603654N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Joint Service Explosive Ordnance Disposal Dev (Adv)
PROJECT NUMBER: S1317 **PROJECT TITLE:** Explosive Ordnance Disposal Diving Sys

C. (U) DESCRIPTION: Development of diving equipment, remote vehicles and explosive charges to support Explosive Ordnance Disposal underwater operation. The equipment must have inherently low acoustic and magnetic signatures in order to allow the EOD technician to safely approach, render safe, and dispose of underwater ordnance.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. (U) Completed TECHEVAL and OPEVAL for the 65' EOD Support Craft.
   b. (U) Received approval for Navy use decision for the Diver Timer/Depth Gauge.
   c. (U) Began TECHEVAL for Chemical Warfare Dive Protective Suit.
2. (U) FY 1991 Program:
   a. (U) Receive AFP for the Chemical Warfare Protective Dive Suit, the EX2 Remotely Operated Vehicle and the MK-98 Neutralization Charge.
   b. (U) Complete TECHEVAL and OPEVAL for the MK-98 Neutralization Charge, Chemical Warfare Dive Protection Suit and the EX2 Remotely Operated Vehicle.
   c. (U) Start TECHEVAL for the EX19 Underwater Breathing Apparatus and the EX2 Remotely Operated Vehicle.
   d. (U) Begin certification testing for Emergency Breathing System.
3. (U) FY 1992 Plans:
   a. (U) Complete TECHEVAL and OPEVAL for the EX19 Underwater Breathing Apparatus.
   b. (U) Complete certification testing for the Emergency Breathing System.
4. (U) FY 1993 Plans:
   a. (U) Start TECHEVAL for the Forward Looking Sonar and Active Thermal Protection.
5. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NCSC, Panama City, FL; NSWC, White Oak, MD; NOSC, San Diego, CA; Naval EODTC, Indian Head, MD; NEDU, Panama City, FL. CONTRACTORS: Texas Research Institute, Inc., Austin, TX; Raliod Inc., Reisterstown, MD; Kappler Industries, Huntsville, AL; Applied Physics Laboratory, University of Washington, Seattle, Wash.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT						
(OPN) #38	2,342	2,116	4,098	3,881	CONT.	CONT.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603656N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: ADVANCED MINOR CALIBER GUN
PROJECT NUMBER: S2038 PROJECT TITLE: ADVANCED MINOR CALIBER GUN

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S2038	ADVANCED MINOR CALIBER GUN (New Start)	0	5477	0	0	CONT	CONT

B. (U) DESCRIPTION: The Advanced Minor Caliber Gun System (AMCGS), Operational Requirement #243-03-92, will be a stabilized, non-deck penetrating, 30MM gun system capable of operating in local or remote control modes. The AMCGS, a Non-Developmental Item (NDI), will provide to surface ships the capability to defend themselves in a low intensity conflict (i.e., Persian Gulf) against small, high speed surface targets and low, slow speed air targets.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:
1. (U) FY 1990 ACCOMPLISHMENTS: Not Applicable.
2. (U) FY 1991 PROGRAM:
   a. (U) Initiated Program Planning/Documentation
   b. (U) Procure ammo
   c. (U) Initiate Procurement Action
3. (U) FY 1992 PLANS: Not Applicable.
4. (U) FY 1993 PLANS: Not Applicable.
5. (U) PROGRAM TO COMPLETION: Not Applicable.

D. (U) WORK PERFORMED BY: IN-HOUSE: NOS, Louisville, KY; NSWC, Dahlgren, VA; NWSC, Crane, IN. CONTRACTORS: TBD

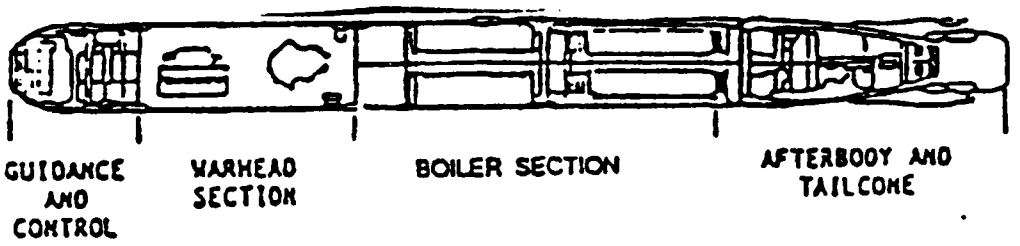
E. (U) RELATED ACTIVITIES: Not Applicable.

F. (U) OTHER APPROPRIATION FUNDS: Not Applicable

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

FY 92/93 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603691N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: MK48 Advanced Capability (ADCAP)
PROJECT NUMBER: S0366 **PROJECT TITLE:** MK48 Advanced Capability



POPULAR NAME: MK48 ADCAP

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	TO COMPLETE
Program Milestones		CCAPS MS-II			
Engineering Milestones			CCAPS CDR		
T&E Milestones	G&C OT-IIIA	CCAPS DT-IA	CCAPS DT-IIA G&C OT-IIIB	CCAPS OT-IIA	
Contract Milestones		CCAPS FSD			

BUDGET ($K)	FY 1990	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL To Complete
Major Contract	17,518	37,749	33,749	41,274	CONT
Support Contract	59	112	115	118	CONT
In-House Support	16,233	21,666	18,593	21,434	CONT
GFE/ Other	160	165	170	175	CONT
TOTAL	33,970	59,692	52,627	63,001	CONT

FY 92/93 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603691N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: MK48 Advanced Capability (ADV)
PROJECT NUMBER: S0366 **PROJECT TITLE:** MK48 Advanced Capability

B. ( ) **DESCRIPTION:** The MK 48 ADCAP torpedo R&D program focuses on two specific areas: the biennial Guidance and Control (G&C) software block upgrades and the Closed Cycle ADCAP Propulsion System (CCAPS).

In addition, this effort will also be used to correct any deficiencies identified during the MK 48 ADCAP Follow-On Test and Evaluation program. The CCAPS,

C. ( ) **PROGRAM ACCOMPLISHMENTS AND PLANS:**

1. ( ) FY 1990 Accomplishments:
   a. (U) Continued CCAPS Demonstration and Validation.
   b. (U) Continued Logistics Support Analysis.
   c. (U) Continued Guidance and Control (G&C) Software Block I Improvement Program.
   d. ( )
2. (U) FY 1991 Program:
   a. (U) Complete *CCAPS Demonstration and Validation.*
   b. (U) Start CCAPS Full Scale Development.
      (1) (U) Conduct CCAPS Preliminary Design Review (PDR).
      (2) (U) Initiate procurement of CCAPS Engineering Development Model (EDM) hardware.
      (3) (U) Continue development of CCAPS technical data package/Level 3 drawings.
      (4) (U) Commence CCAPS Developmental Testing In-Water Runs.
   c. (U) Complete G&C Software Block I and start G&C Software Block II Improvement Program.
3. (U) FY 1992 Plans:
   a. (U) Conduct CCAPS CDR.
   b. (U) Fabricate CCAPS TECHEVAL/OPEVAL units.
   c. (U) Continue G&C Software Block II Improvement Program.
   d. (U) Commence In-Water Testing of CCAPS EDM units.

FY 92/93 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603691N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: MK 48 Advanced Capability (Adv)
PROJECT NUMBER: S0366 PROJECT TITLE: MK 48 Advanced Capability

4. (U) FY 1993 Plans:
   a. (U) Complete CCAPS OT-IIA.
   b. (U) Complete G&C Software Block II and start G&C Software Block III Improvement Program.
   c. (U) Commence Lethality Improvement Program.
5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NUSC, Newport, RI, is the Technical Direction Agent for the program; NUWES, Keyport, WA; NOSC, San Diego, CA; NCSC, Panama City, FL; CONTRACTORS: Sundstrand, Rockford, IL is the CCAPS prime contractor; ARL/Penn State University, State College, PA; APL/University of Washington, Seattle, WA; and Hughes Aircraft Company, Fullerton, CA provide engineering support.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
1. (U) Technical changes: None
2. (U) Schedule changes: Eight month schedule slip in CCAPS FSD.
3. ( ) Cost changes: None

F. (U) PROGRAM DOCUMENTATION:
1. (U) NDCP Rev. 2, dated 6 Sep 88, subject "Navy Decision Coordinating Paper (NDCP) for Torpedo MK 48 ADCAP Program."
2. (U) OPNAV TEMP 371 Rev. 3 dated 20 Mar 90, subject "Test and Evaluation Master Plan NO. 371 for Torpedo MK48 ADCAP."
3. (U) OPNAV TEMP 371-1 "Test and Evaluation Master Plan for CCAPS" draft in review cycle.
4. (U) Operational Requirement 067-02-86, CCAPS, Jan 86.
5. (U) Operational Requirement 070-02-86, G&C Software, Jan 86.
6. (U) Draft TOR for subject: "Improved Submarine Torpedo Warhead" for Warhead Lethality Improvement Program.

G. (U) RELATED ACTIVITIES: Submarine Arctic Warfare Development Program (PE 0603562N, Proj S1739) and Submarine Combat Control System Improvement Program (PE 0604562N, Proj S0236).

FY 92/93 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603691N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: MK 48 Advanced Capability (Adv)
PROJECT NUMBER S0366 PROJECT TITLE; MK 48 Advanced Capability

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(PROCUREMENT*						
WPN, 311100 ($K)						
00 CCAPS Procurement						
Quantities						

* Propulsion systems only, not all-up-round torpedoes.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None

J. (U) TEST AND EVALUATION: This information is included in the FY 1992 Congressional Data Sheets.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0603701N Budget Activity: 2
Program Element Title: Human Factors Engineering Development

A. (U) RESOURCES: (Dollars in Thousands)

Project Number	Title	FY 1990 Actual	FY 1991 Estimate	FY 1992 Estimate	FY1993 Estimate	To Complete	Total-Program
W0542	Air Human Factors Engineering	845	995	994	1,014	Cont	Cont
R1771	Ship Human Factors Engineering	1,617	1,868	1,874	1,902	Cont	Cont
TOTAL		2,462	2,863	2,868	2,916	Cont	Cont

B. (U) BRIEF DESCRIPTION OF ELEMENT: This program improves fleet readiness through human factors technology. It provides a better fit between the operator, equipment, and mission so that hardware systems will be operated with fewer human-induced errors and with greater safety and maintainability. The objectives of this program are: (1) to improve crew and work station design and evaluation methods so as to reduce errors and increase effectiveness of operations, (2) to establish target-acquisition and weapon-system standards for displays people can understand, (3) to develop airborne tactical decision aids for fleet Air Defense, ASW and strike missions, (4) to provide initial human factors support for new systems, (5) to improve the integration between ships and their crews, and (6) to reduce training time and costs. The program also develops and evaluates new techniques for human factors based system design.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0603701N Budget Activity: 2
Program Element Title: Human Factors Engineering Development
Project Number: W0542 PROJECT TITLE: Air Human Factors Engineering

C. (U) PROJECT DESCRIPTION: This project develops/demonstrates human factors engineering technology for (1) establishing human factors requirements for new systems, and (2) evaluating impact of human factors on effectiveness of systems in development or test and evaluation.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

a. Initiated integrated Multi-Sensor Integration (MSI) decision aid development for fighter aircraft.

b. Demonstrated HFE Design, Test, and Evaluation tools for aircraft flying qualities evaluations, systems performance analyses, crew coordination performance evaluations.

c. Continued substantial interagency (DOD, DOT, DOE) HFE coordination.

2. (U) FY 1991 Program:

a. Transition HFE DT&E tools to Air Combat Environment Test and Evaluation Facility (ACETEF) 6.4 program;

b. Complete development/demonstrate/transition MSI system to F-14 and F-18. MSI system will form basis for future development in common/standardized modules for MSI in tactical aircraft.

3. (U) FY 1992 Plans:

a. Initiate development/demonstrate common/standardized hardware and software modules for integrated airborne and shipborne displays and tactical decision support systems for day/night air warfare.

b. Initiate development/demonstrate of HFE tools to support design requirement analysis and developmental/operational test and evaluation of common modules/displays for day/night air warfare.

4. (U) FY 1993 Plans:

a. Continue development/demonstrate common/standardized tactical decision support system for air warfare. Demonstrate integration in interoperability of F-14, F/A-18, P-3 and Unmanned Aerial Vehicle sensor control functions in network high fidelity man-in-loop simulations.

5. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: Naval Air Development Center, Warminster, PA; Naval Research Laboratory, Washington, DC; and Los Alamos National Laboratory, Los Alamos, NM.

F. (U) RELATED ACTIVITIES: PE 0602234N, Train and Human Factors Technology; PE 0604703N, Personnel, Training, Simulation and Human Factors; PE0604264N, Advanced Technology Crewstation; and PE604940D, Air Combat Environment Test and Evaluation Facility (ACETEF).

G. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None applicable.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0603701N Budget Activity: 2
Program Element Title: Human Factors Engineering Development
Project Number: R1771 **Project Title:** Ship HF Engineering Development

C. (U) PROJECT DESCRIPTION: Responds to GAO, Defense Science Board, and Naval Research Advisory Committee recommendations to improve shipboard performance by incorporating human engineering during system acquisition. Thrust areas: (1) tactical info management and decision making, (2) battle force information management, (3) multisensor integration and data display, (4) combat system design, and (5) computer-based operator aids.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS

1. (U) FY 1990 Accomplishments:

a. Completed the Submarine Combat System Operability Evaluation Facility. Did two studies to evaluate a Torpedo Employment Aide.

b. Transitioned the Assessment/Force Accounting Database (AFAD) on all Navy ships, aircraft, and major weapons systems.

c. Developed designs for MILSTAR Operational Requirements Aid (MORA) to allot MILSTAR resources without added training or manpower.

d. Completed electronic conversion of prototype integrated sonar display formats for surface combatants.

e. Conducted human engineering assessment of AN/SLQ-32 electronic warfare system.

2. (U) FY 1991 Program:

a. Develop adaptive tactical display for enhanced situation assessment.

b. Identify algorithms and display needed to fuse ASW data.

c. Complete construction of prototype MILSTAR operator aide.

d. Conduct sonar format simulation and assessment for surface ship application and recommendations for AN/SQQ-89(I) sonar use.

3. (U) FY 1992 Plans:

a. Evaluate adaptive tactical display for submarine approach officers.

b. Test algorithms and display designs for ASW data fusion.

c. Evaluate MILSTAR operator aid and develop operational specifications.

d. Develop surface ship sonar format design specification.

4. (U) FY 1993 Plans:

a. Prototype tactical display for submarine approach officers.

b. Prototype test of MILSTAR operator aid.

c. Detail specifications for air and submarine display format designs.

5. (U) Program to completion: This is a continuing program.

E. (U) WORK PERFORMED BY: Naval Ocean Systems Center.

F. (U) RELATED ACTIVITIES: PE 0602234N, Training and Human Technology; PE 0604703N, Personnel, Training, Simulation and Human Factors.

G. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603702N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ocean Engineering System Development
PROJECT NUMBER: S0394 PROJECT TITLE: Shallow Depth Diving Equipment

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0394	Shallow Depth Diving Equipment	2,113	2,263	1,652	1,241	CONT.	CONT.

B. (U) DESCRIPTION: This program develops systems to support conventional diver operations from surface platforms to depths of 450 feet. Diver operations include ship husbandry, salvage/recovery and submarine rescue operations to support national as well as Navy needs around the world. Modern certifiable diving systems which ensure diver safety and allow maximum work efficiency will replace currently antiquated systems.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:
   a. (U) Conducted breathing resistance testing (manned) of Conventional Diving System (CDS).
   b. (U) Developed Navy certifiable, lightweight diver's aircompressor.
2. (U) FY 1991 PROGRAM:
   a. (U) Complete manned Development Testing (DT IIA AND IIB) of CDS.
   b. (U) Conduct diver testing of underwater diver tools and diver's communications.
   c. (U) Begin reliability and operability testing of lightweight air compressor.
3. (U) FY 1992 PLANS:
   a. (U) Complete Navy life support certification of CDS.
   b. (U) Complete reliability testing of light weight diver's air compressor.
   c. (U) Continue development of special diver tools.
4. (U) FY 1993 PLANS:
   a. (U) Complete Operational Evaluation (OPEVAL) of CDS. Complete Logistics Readiness Review.
   b. (U) Conduct DT IIB (TECHEVAL) of light weight diver's air compressor.
   c. (U) Continue development of special diver tools.
5. (U) PROGRAM TO COMPLETION:
   a. (U) Achieve approval for Service use (ASU) of CDS
   b. (U) Achieve ASU of light weight diver's air compressor
   c. (U) Provide special tools for fleet divers.

D. (U) WORK PERFORMED BY: IN-HOUSE: Naval Coastal Systems Center, Panama City, FL; Navy Experimental Diving Unit, Panama City, FL. CONTRACTORS: Competitive.

E. (U) RELATED ACTIVITIES: PE 0603713N Ocean Eng Tech Dev, PE 1110011N Spec OPS Force Enhancements

F. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	** TOTAL PROGRAM
(U) OPN #42 (11300)	1,912	1,965	1,980	2,100	CONT.	CONT.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: US/UK MOU for diving R&D; US-France cooperation.*

FY 1992/93 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603704N BUDGET ACTIVITY: 4-Tactical Program
PROGRAM ELEMENT TITLE: ASW Oceanography

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0118	Ocean Measurement Sensors	3,506	3,650	3,728	3,610	Continuing	Continuing
X1596	Satellite Applications and Technology	4,013	4,684	4,740	4,626	Continuing	Continuing
R1987	Mapping, Charting and Geodesy Techniques	1,519	1,368	1,422	1,330	Continuing	Continuing
	TOTAL	9,038	9,702	9,894	9,557		

B. (DESCRIPTION: This program develops highly specialized, ultra-high resolution oceanographic instrumentation and techniques to measure acoustic and non-acoustic ocean parameters in support of ASW operations. This program also develops techniques to analyze and display the measured environmental data to support ocean survey, ocean reconnaissance and Fleet command requirements for ASW and submarine operations. This program is the principal source of advanced technology for Naval oceanographic survey support to

The Mapping, Charting and Geodesy project will address the bathymetric and gravimetric needs of the Fleet for greater accuracies and densities of geophysical data to support the more advanced weapon systems and navigation systems being introduced to the Fleet. The Satellite Applications and Technology project develops algorithms to process and display remotely sensed satellite data.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603704N BUDGET ACTIVITY: 4-Tactical Program
PROGRAM ELEMENT TITLE: ASW Oceanography
PROJECT NUMBER: R0118 PROJECT TITLE: Ocean Measurement Sensors

C. ( ) DESCRIPTION:

Additionally, the project develops instrumentation in response to Fleet environmental requirements for amphibious and special warfare.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:
1. (U) FY 1990 ACCOMPLISHMENTS:
a. (U) Completed air expendable optical "K" meter (AXKT).
b. (U) Completed expendable conductivity sensor (XCTD) for surveys.
c. (U) Conducted engineering sea trial of thermistor/conductivity/optical (TSS) tow chain in sub op areas.
d. (U) Conducted sea trial of Tactical Oceanographic Monitoring System (TOMS) aboard SSN 639.
2. (U) FY 1991 PROGRAM:
a. (U) Complete TSS/NA-16 tow string transition to NAVOCEANO.
b. (U) Perform non-acoustic oceanographic survey in Mediterranean with new sensors in conjunction with ONR 6.1 study.
c. (U) Incorporate additional environmental sensors into TOMS.
d. (U) Provide report on SAR/remote ice thickness evaluation.
3. (U) FY 1992 PLANS:
a. (U) Completed towed bioluminescence survey system.
b. (U) Complete environmental aspects of vorticity sensor.
c. (U) Report on Mediterranean non-acoustic phenomena.
d. (U) Complete expendable integrated optical sensor package (AXOT).
4. (U) FY 1993 PLANS:
a. (U) Complete 6.3 aspects of TOMS system for submarine TACAIDS.
b. (U) Complete expendable bioluminescence sensors.
c. (U) Add environmental sensors to drifting buoy units.
d. (U) Upgrade tow chain for survey use.
5. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NOARL SSC, MS; NOSC, San Diego, CA. CONTRACTORS: APL/JHU, Laurel, MD; APL/UW, Seattle, WA; Sippican Corp., Marion, MA; UCSB, Santa Barbara, CA; ARETE Corp., Washington, DC; General Dynamics/EBD, Groton, CT.

F. (U) RELATED ACTIVITIES: PE 0602435N, Ocean and Atmospheric Support Technology; PE 0605853N, Acoustic and Non-Acoustic Analysis Support; PE 0101224N, SSBN Security; PE 0603528N, Non-Acoustic Submarine Warfare.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1992/93 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603704N BUDGET ACTIVITY: 4-Tactical Program
PROGRAM ELEMENT TITLE: ASW Oceanography
PROJECT NUMBER: X1596 PROJECT TITLE: Satellite Applications and Technology

C. (U) DESCRIPTION: This project develops software techniques for the integration and subsequent application of tactically significant ocean and atmospheric features derived from satellite-borne sensors. This work includes data assimilation, modeling, operational demonstrations, and expert systems (artificial intelligence) development.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:
a. (U) Began applications of remote sensing in fleet acoustic exercises.
b. (U) Transitioned satellite-derived wind speed measurements to operational use.

2. (U) FY 1991 PROGRAM: Continue development of radar altimetry applications; continue acoustic exercise participation; begin development of expert system image analysis techniques.

3. (U) FY 1992 PLANS: Begin development of new satellite applications modules for use in the Tactical Environmental Support System - TESS(3); continue acoustic exercise participation and operational demonstrations.

4. (U) FY 1993 PLANS: Continue development of radar altimetry applications; continue development of new satellite applications modules for use in TESS(3); begin transition of Synthetic Aperture Radar operational capability.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NOARL, Monterey, CA; NOARL, Bay St. Louis, MS; NRL, Washington, DC. CONTRACTORS: Not applicable.

F. (U) RELATED ACTIVITIES: PE 0305111N, Weather Service; PE 0603207N, Air/Ocean Tactical Applications; PE 0604230N, Warfare Support Systems.

G. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENT: None.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603704N BUDGET ACTIVITY: 4-Tactical Program
PROGRAM ELEMENT TITLE: ASW Oceanography
PROJECT NUMBER: R1987 PROJECT TITLE: Mapping, Charting and Geodesy

C. (U) DESCRIPTION: This project develops new charting, bathymetry, magnetic, and gravimetric survey techniques necessary to reduce the existing 300 shipyear shortfall in accessible, coastal hydrographic survey requirements.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:
   a. (U) Develop and maintain a library of standard digital MC&G products.
   b. (U) Refine algorithms for processing optical bathymetry data.
   c. (U) Initiate aircraft positioning techniques for gravimetry.
   d. (U) Construct tidal anomaly data base for measurement requirements.

2. (U) FY 1991 PROGRAM:
   a. (U) Transition coordination for digital products and newsletter.
   b. (U) Investigate variability of bathymetry for interpretation schemes.
   c. (U) Complete coastal optics planner.
   d. (U) Continue weapons system requirements evaluation.

3. (U) FY 1992 PLANS:
   a. (U) Continue digital MC&G Analysis and evaluation task.
   b. (U) Complete tidal model and conduct test and evaluation.
   c. (U) Transition Global Positioning System (GPS) Interferometry technology for survey.

4. (U) FY 1993 PLANS:
   a. (U) Continue Digital MC&G Analysis and evaluation task.
   b. (U) Complete Statistical Model on Sea Floor Roughness.
   c. (U) Investigate laser bathymetry techniques.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NOARL SCC, MS; NRL, Washington, DC. CONTRACTORS: Planning Systems, Inc., Slidell, LA; San Diego State University, San Diego, CA; NOAA PMEL, Newport, OR.

F. (U) RELATED ACTIVITIES: PE 0601153N, Defense Research Sciences; PE 0602435N, Ocean and Atmospheric Support Technology; PE 0301327N, Technology, Reconnaissance, and Surveillance; PE 0305160N, Defense Meteorological Satellite Program; PE 0603785N, ASW Environmental Acoustic Support.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0603706N **Budget Activity:** 2
Program Element Title: Medical Development
A. (U) RESOURCES: (Dollars in Thousands)

Project Number	Title	FY 1990 Actual	FY 1991 Estimate	FY 1992 Estimate	FY 1993 Estimate	To Comp	Total Program
M0095	Fleet Health Technology	12,700	13,723	12,060	12,360	Cont.	Cont.
M0096	Fleet Health Standards	4,212	4,168	4,162	3,898	Cont.	Cont.
M2022	Bone Marrow Registry	15,000	5,975	0	0	0	25,575
	TOTAL	31,912	23,866	16,222	16,258	Cont.	Cont.

B. (U) DESCRIPTION:

The Navy Medical Department's mission is the care and treatment of Navy and Marine Corps personnel in operational theaters with the ultimate goals of increased return-to-duty rates, enhanced performance, and reduced morbidity and mortality. Also, medically based standards must be developed to permit the optimal selection of personnel for specific Navy jobs and to ensure the physical readiness and safety of these personnel in the operational environment. Specifically, this program element will support the development of better methods for treating battlefield casualties. A further objective is to improve the quality of combat personnel by developing validated techniques for medical selection and training, as well as standards and procedures for protecting personnel during exposure to Navy and Marine Corps operational environments. The results of this program will be the identification of the best qualified Navy personnel, improved job- task performance, and the reduction of costs attributable to attrition and injury. In FY 1990 the program in toxicological assessment of chemicals used in Navy operations was transitioned to O&M,N funding for support.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0603706N **Budget Activity:** 2
Program Element Title: Medical Development
Project Number: M0095 **Project Title:** Fleet Health Technology

A. (U) **RESOURCES:** (Dollars in Thousands)

Project Number	Title	FY 1990 Actual	FY 1991 Estimate	FY 1992 Estimate	FY 1993 Estimate	To Comp	Total Program
M0095	Fleet Health Technology	12,700	13,723	12,060	12,360	Cont.	Cont.

B. (U) **DESCRIPTION:**

The Navy Medical Department's ultimate mission is the care and treatment of Navy and Marine Corps casualties in operational theaters. In addition, the Medical Department must be able to prevent or treat non-battle injuries to guarantee that the optimal number of personnel are combat ready. This project supports the development of improved methods for treating battlefield casualties. Specifically, better methods for guaranteeing an adequate blood supply in operational theaters; improving wound healing; treating shock and sepsis; preventing cold-injuries and treating casualties in extreme environments; treating failure of blood-forming cells; and preventing and treating incapacitating dental conditions are being developed.

C. (U) **PROGRAM ACCOMPLISHMENTS AND PLANS:**

1. (U) FY 1990 Accomplishments
   a. (U) Completed evaluation of blood enzymatically converted from type-B to type-O
   b. (U) Began evaluation of blood enzymatically converted from type-A to type-O
   c. (U) Completed initial studies on prolonging the shelf-life of frozen, thawed red cells
   d. (U) Completed development of a prototype device for rapidly thawing frozen red blood cells in a dry environment
   e. (U) Transitioned wound healing work to an Advanced Technology Demonstration project
   f. (U) Completed development of a database to monitor the incidence of disease and non-battle injuries in the Navy
   g. (U) Developed early methods to prevent bacteria from adhering to vascular grafts
   h. (U) Initiated studies to develop techniques to freeze dry red blood cells; thus reducing the logistical requirements associated with frozen red cells
   i. (U) Initiated a study to determine the effect of shipboard diet and deployment on serum cholesterol levels
   j. (U) Initiated studies to evaluate existing lab equipment for Marine Corps medical field use
2. (U) FY 1991 Program
   a. (U) Continue evaluation of blood enzymatically converted from type-A to type-O

Program Element: 0603706N **Budget Activity: 2**
Program Element Title: Medical Development
Project Number: M0095 **Project Title: Fleet Health Technology**

5. (U) **PROGRAM TO COMPLETION:** This is a continuing program.
   a. (U) Complete development of synthetic surfactant and treatment strategies for shock lung
   b. (U) Continue the development and testing of drugs to treat casualties in cold environments
   c. (U) Complete the development of methods for conversion of all types of red cells to type-O negative (universal donor) red cells
   d. (U) Continue development of methods to freeze-dry platelets for operational use
   e. (U) Complete advanced development of long-term storage for freeze-dried red cells
   f. (U) Continue studies to enhance dental-readiness state of Navy and Marine Corps personnel

D. (U) **WORK PERFORMED BY:** In-house: Naval Medical Research Institute, Bethesda, MD; Naval Aerospace Medical Research Laboratory, Pensacola, FL; Naval Health Research Center, San Diego, CA; Naval Submarine Medical Research Laboratory, Groton, CT; Naval Dental Research Institute, Great Lakes, IL; Contractors: Boston University, Boston, MA; New York Blood Center, New York, NY; Georgetown University, Washington, DC.

E. (U) **COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:**
   1. (U) TECHNOLOGY CHANGES: NONE
   2. (U) SCHEDULE CHANGES: NONE
   3. (U) COST CHANGES: NONE

F. (U) **PROGRAM DOCUMENTATION:** Not Applicable

G. (U) **RELATED ACTIVITIES:** This program is coordinated through the Armed Services Biomedical Research Evaluation and Management Committee. Additional coordination is provided by various reviews sponsored by the Under Secretary of Defense for Acquisition to ensure that the work is complementary to, rather than duplicative of, the programs of the other military departments and non-DOD research organizations.

H. (U) **OTHER APPROPRIATION FUNDS:** Not Applicable

I. (U) **INTERNATIONAL COOPERATIVE AGREEMENTS:** Not Applicable

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0603706N Budget Activity: 2
Program Element Title: Medical Development
Project Number: M0096 Project Title: Fleet Health Standards

C. (U) **DESCRIPTION:** This project will improve the quality of combat personnel by developing valid medical standards for selection, training, and retention; and reduce attrition and injury, and enhance performance by developing standards and procedures to protect personnel in Navy operational environments.

D. (U) **PROGRAM ACCOMPLISHMENTS AND PLANS:**

1. (U) FY 1990 Accomplishments
   a. (U) Completed performance-based aviation selection test battery
   b. (U) Continued studies of low-level laser effects on visual search
   c. (U) Began field studies to assess the efficacy of laboratory-based performance-enhancement countermeasures in sustained combat
   d. (U) Initiated studies on biomedical causes of Simulator sickness
   e. (U) Initiated studies to enhance Spatial awareness
   f. (U) Transitioned toxicology of Navy unique chemicals to O&M,N

2. (U) FY 1991 Program
   a. (U) Complete studies of effects of low level lasers on visual search tasks and begin to apply data to eye protection technology
   b. (U) Complete neutron and continue radiofrequency dosimetry effort
   c. (U) Continue studies on Simulator sickness and Spatial awareness

3. (U) FY 1992 Plans
   a. (U) Complete development of radiofrequency radiation dosimetry
   b. (U) Continue field studies of sustained combat performance
   c. (U) Continue studies on Simulator sickness and Spatial awareness
   d. (U) Initiate studies to ameliorate G-induced loss of consciousness

4. (U) FY 1993 Plans
   a. (U) Complete field studies of sustained combat performance
   b. (U) Complete field studies to improve performance in cold
   c. (U) Complete studies on Simulator sickness and Spatial awareness
   d. (U) Initiate studies of helmets on neck injuries in high G turns
   e. (U) Initiate studies to prevent dehydration in cold water

5. (U) Program to Completion: This is a continuing program.

E. (U) **WORK PERFORMED BY:** In-house: Naval Aerospace Medical Research Laboratory, Pensacola, FL; Naval Health Research Center, San Diego, CA.

F. (U) **RELATED ACTIVITIES:** This program is coordinated through Biomedical Research, sustained operations, and aeromedical research tri-service groups

G. (U) **OTHER APPROPRIATION FUNDS:** Not Applicable

H. (U) **INTERNATIONAL COOPERATIVE AGREEMENTS:** Not Applicable

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0603706N Budget Activity: 2
Program Element Title: Medical Development (Advanced)
Project Number: M2022 Project Title: Bone Marrow Registry

C. (U) DESCRIPTION: This project funds the enhancement of the national registry of bone marrow donors. This registry provides potential donors for the thousands of personnel each year that are candidates for bone marrow transplantation but do not have tissue compatible relatives available to donate bone marrow. This registry also performs research to determine how perfect a match is necessary for transplantation to be successful in unrelated transplants.

D. (U)PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:
   a. (U) Continue typing of civilian volunteers on waiting lists, minority donors, and short-term typing needs.
   b. (U) Initiate a program to recruit and HLA type DOD volunteers, expand Navy testing capability, and develop improved typing procedures.
   c. (U) Initiate standard typing of DOD donors from the Washington D.C. area with goal of 2000 donors completed by January 1991.

2. (U) FY 1991 Program:
   a. (U) Continue coordination of civilian with National Marrow Donor program recruit DOD donors for inclusion in the National Marrow Registry.
   b. (U) Type recruited DOD donors for HLA A,B, and dR types. Plan is to recruit and type 10,000 donors.
   c. (U) Develop DNA technology for reducing time and cost required for HLA testing, particularly testing samples from minority volunteers.

3. (U) FY 1992 Plans: Not Applicable. Program completes in FY 1991.

E. (U) WORK PERFORMED BY: Contractors: American Red Cross, Washington, DC; University of Washington, Seattle, WA; Blood Center of Southern Wisconsin, Milwaukee, WI.

F. (U) RELATED ACTIVITIES: This program supports the only national bone marrow donor registry. The Department of Health and Human Services share the management and support of the bone marrow donor registry.

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0603707N Budget Activity: 2
Program Element Title: Manpower & Personnel Systems
Project Number: R1770 Project Title: Manpower and Personnel Systems

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R1770	MP&PERS SYSTEMS	3,008	3,187	3,245	3,245	Cont	Cont

B. (U) DESCRIPTION: The objective of this program is to improve the utilization and allocation of Navy personnel. Specifically, systems and models are designed and developed to improve personnel assignment, retention, and job performance. Models are also used to reduce cost and improve effectiveness through better prediction and management of personnel inventory changes. Supporting technology for model development includes mathematical optimization, information systems technology, statistical/econometric forecasting, and human performance and attitude measurement.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS: Tested/evaluated optimal assignment system for 50% of enlisteds. Validated selection standards for electrical jobs. Developed recruiting resource decision support system. Developed/tested paperless survey system.

2. (U) FY 1991 PROGRAM: Establish quality selection standards for major enlisted job categories. Test optimal enlisted assignment system using PCS and school capacity constraints. Test enlisted/civilian resource trade-off model.

3. (U) FY 1992 PLANS: Validate inventory forecasting model for new enlisted skill classifications. Test system that deploys recruiting incentives to maximize high quality contracts. Develop comprehensive retention decision model.

4. (U) FY 1993 PLANS: Develop method for gauging personnel system impacts (e.g., promotions, recruiting) of smaller force structures, reduced missions. Test models to allocate recruiting resources among geographic subdivisions.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVPERSRANDCEN, San Diego, CA. CONTRACTORS: Systems Exploration Inc., San Diego, CA; B-K Dynamics, Rockville, MD; SYSCON Inc., Washington, DC; Resource Consultants Inc., Washington, DC; Maxima, San Antonio, TX.

E. (U) RELATED ACTIVITIES: 0602722A, Personnel and Training; 0602233N, Mission Support Technology; 0602703F, Personnel Utilization Technology; 0603731A, Manpower and Personnel; 0604703N, Personnel Training, Simulation, and Human Factors; 0603732M, Marine Corps Advanced Manpower Training Systems; and 0603704F, Manpower and Personnel Systems Technology.

F. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603708N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Anti-Submarine Warfare Signal Processing

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0490	BEARTRAP	10,596	15,523	15,186	15,639	CONT	CONT
S0823	Acoustic Performance Prediction	6,548	8,968	9,317	9,371	CONT	CONT
X0821	Advanced Acoustic Processor	3,956	3,736	3,309	3,518	CONT	CONT
	TOTAL	21,100	28,227	27,812	28,528		

B. ( ) DESCRIPTION: The Anti-Submarine Warfare (ASW) Signal Processing program provides for the

The program is responsive to requirements to improve all ASW systems to counter the existing and projected submarine threats and to develop system performance prediction software for all acoustic ASW systems.

( ) The BEARTRAP project is an program providing

To accomplish this BEARTRAP incorporates a rapid development effort for advanced ASW.

(U) The Advanced Acoustic Processing project independently evaluates Anti-Submarine Warfare Signal Processing systems aboard tactical air, surface and subsurface platforms. This evaluation is used to reduce redundant development efforts and permits technology transfer among advanced development platform-related signal processing programs.

(U) The Acoustic Performance Prediction project develops computer based, on-board capabilities to provide acoustic system performance predictions and mode selection guidance for all tactical ASW Platforms based on in-situ measurements and environmental data bases. This capability is required as ASW sensor and weapon systems become more complex, since their optimal tactical applications are based on knowledge of the effects of current acoustic environmental conditions. This project enables the fleet to obtain the full performance potential of ASW systems by extending threat detection ranges and maximizing overall ASW platform survivability in all geographies areas, including the Arctic.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603708N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Anti-Submarine Warfare Signal Processing
PROJECT NUMBER: W0490 PROJECT TITLE: BEARTRAP

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0490	BEARTRAP	10,596	15,523	15,186	15,639	CONT	CONT

B. ( ) DESCRIPTION: In the mission of

Project BEARTRAP has had a major and significant impact upon anti-submarine warfare. This is a result of both

and the developmental research equipments and concepts initiated by BEARTRAP and later introduced into the ASW community. BEARTRAP consists of a combination of developmental and prototype

P-3C aircraft, along with special ASW sensors, post mission processing, calibration equipment, and specially trained personnel. BEARTRAP, incorporating a rapid development capability, developed

either currently utilized by operational units or planned for future systems. BEARTRAP is in a

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

a. ( ) Continue
continue development of
and provide

b. ( ) Initiate developmental efforts for

c. ( ) Initiate effort to provide

d. ( ) Complete developmental efforts for integrated

PROGRAM ELEMENT: 0603708N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Anti-Submarine Warfare Signal Processing
PROJECT NUMBER: W0490 PROJECT TITLE: BEARTRAP

e. ( ) Initiated in conjunction with to provide

f. ( ) Supported initiation of

2. (U) FY 1991 Program:

a. ( ) Continue

b. ( ) Continue

and aircraft. Continue equipment.

c. ( ) Initiate aircraft to provide Support evaluation of

d. ( ) Continue redesign of BEARTRAP aircraft ASW capabilities to provide capabilities. Continue and start

e. (U) Complete installation of to aircraft

3. (U) FY 1992 Plans:

a. ( ) Continue efforts.

b. ( ) Continue hardware and software development efforts for Continue to the AQL system. Complete equipment.

c. ( ) Add aircraft.

d. ( ) Establish capabilties.

e. ( ) Integrate used in

f. ( ) Provide special requests.

g. ( ) Continue to support program.

PROGRAM ELEMENT: 0603708N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Anti-Submarine Warfare Signal Processing
PROJECT NUMBER: W0490 PROJECT TITLE: BEARTRAP

4. (U) FY 1993 Plans:
   a. ( ) Continue.

   b. ( ) Continue

   Continue

   c. ( ) Complete

   d. ( ) Provide

   e. ( ) Establish

   f. (U) Develop

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, DC; NAVSC, Washington, DC; COMPATWINGSPAC, San Francisco; COMPATWINGSLANT, Jacksonville FL; NAVAIRDEVCEN, Warminster, PA; NAVTESTCEN, Patuxent River, MD; NAVSWC, White Oak, MD; NAVWPNSUPCEN, Crane, IN; NAVAVIONICCEN, Indianapolis, IN; and NAVOCEANSYSCEN, San Diego, CA. CONTRACTORS: TRACOR, Austin, TX; G. P., TAURIO, Columbia, MD; METRON, Inc., Warminster, PA; Norden Systems, Melville, NY; Sparton Electronics Div., Jackson, MI; and Mitre, Mclean, VA.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
   1. (U) Technical changes: None
   2. (U) Schedule changes: None
   3. (U) Cost changes: Not Applicable

F. (U) RELATED ACTIVITIES: PEs 0603529N (Advanced ASW Target); 0603553 (Surface ASW); 0604713N (Surface ASW Systems Improvement); 0603691N (MK 48 Advanced Capabilities); 0603610N (Advanced Lightweight Torpedo); 0603254N (Air ASW Adv Sensors); 0604261N (Acoustic Search Sensors); 0604221N (P-3C Mod Program); 0604212N (LAMPS); 0604229N (Carrier Inner zone ASW Helo); 0603792N (Advanced Technology Transition); 0603747N (Advanced Collection Technology).

G. (U) PROGRAM DOCUMENTATION:
   NDCP W0-49-AS 6/20/80
   NAPDD 076-095 4/15/86

H. (U) OTHER APPROPRIATION FUNDS: Not Applicable

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE: This is a continuing program.

PROGRAM ELEMENT: 0603708N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Anti-Submarine Warfare Signal Processing
PROJECT NUMBER: S0823 PROJECT TITLE: Acoustic Performance Prediction (APP)

C. (U) DESCRIPTION: APP develops on-board software capabilities that provide acoustic sensor performance predictions and tactical decision aids for all tactical ASW platforms using in-situ measurements and new/updated environmental data bases. APP enables the full performance potential of complex ASW systems by increasing their detection and tracking performance.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY-1990 ACCOMPLISHMENTS:
   a. (U) Continued to update models, data bases and at-sea systems.
   b. (U) Continued development/evaluation of prototype APP system.
   c. (U) Developed preliminary Integrated Oceanographic Tactical Aid (IOTA) requirements specification.
2. (U) FY 1991 PROGRAM:
   a. (U) Update next generation APP system based on at-sea results and incorporate ASW Tactical Decision Aid (ASWTDA) capability.
   b. (U) Update next generation APP system with reverberation monitoring.
   c. (U) Develop/test APP products for ASW asset tactical employment.
   d. (U) Complete IOTA specifications and begin system development.
   e. (U) Develop improved sensor prediction module for TESS 3.0.
3. ( ) FY 1992 PLANS:
   a. (U) Update models, data bases and at-sea systems.
   b. ( ) Incorporate models into APP Systems.
   c. (U) Sea-test improved APP ADM/ASWTDA with reverberation monitoring.
   d. (U) Complete development of initial IOTA system and begin testing.
   e. (U) Develop/sea-test improved ASW search employment guidance.
4. ( ) FY 1993 PLANS:
   a. (U) Update models, data bases and at-sea systems.
   b. (U) Update SFMPL to provide expanded automatic data entry.
   c. ( ) Sea-test ADM with models.
   d. (U) Update/improve IOTA based on results of at-sea evaluation.
   e. (U) Update ASW search employment guidance based on at-sea evaluation.
5. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NUSC Newport, RI; COMNAVOCEANCOM, Bay St. Louis, MS; NAVOCEANSYSCEN, San Diego, CA; CONTRACTORS: Analysis & Technology, North Stonington, CT; Sonalysts, Waterford, CT; D.H. Wagner, Sunnyvale, CA.

F. (U) RELATED ACTIVITIES: PE 0604575N, AN/SQS-53C; PE 0604524N, Submarine Combat Systems Development; PE 0604713N, ASW Surface Systems Improvements; PE 0603207N, Tactical Environment Support Systems; PE 0604503N, Submarine Sonar Development.

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603708N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Anti-Submarine Warfare Signal Processing
PROJECT NUMBER: X0821 PROJECT TITLE: Advanced Acoustic Processing

C. (U) DESCRIPTION: The Advanced Acoustic Processing project independently evaluates anti-submarine warfare acoustic signal and post processing systems aboard tactical air, surface and subsurface platforms. Reduces redundant development efforts and facilities technology transfer among advanced development, platform-related signal processing programs.

D. ( ) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. ( ) FY 1990 Accomplishments: Continued testing of P-3C Update IV post processing algorithms and the Surface Ship Torpedo Defense (SSTD) algorithms, submarine and surface ship passive ASW systems and broadband sonobuoy systems; continued evaluation of ASW training; initiated testing SURTASS and active sonars in surface ships; supported [redacted] sea test, data analysis, at sea operation, and system anaylsis.

2. (U) FY 1991 Program: Continue testing of P-3C Update IV, SSTD, SURTASS, submarine and surface ship passive ASW systems; continue ASW training evaluation; continue testing active sonars in surface ships; complete testing of broadband sonobuoy systems.

3. (U) FY 1992 Plans: Complete testing SSTD, SURTASS and surface ship passive ASW systems; continue testing P-3C Update IV, submarine passive ASW systems, and active sonars in surface ships; complete air ASW systems training evaluation; continue evaluation of training in surface ship ASW systems; initiate training evaluation for submarine passive ASW systems and testing of BSY-2 ASW systems.

4. (U) FY 1993 Plans: Complete testing P-3C Update IV; continue evaluation of training for submarine and surface ship passive ASW systems; continue testing of active sonars in surface ships and BSY-2 ASW systems; initiate testing of active sonars in submarines.

6. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVSWC, White Oak, MD.
CONTRACTORS: TRW Systems, McLean, VA (Lead Contractor).

F. (U) RELATED ACTIVITIES: 0604503N, Submarine Sonar Development; 0604219N, Airborne Anti-Submarine Warfare Development; 0604524N, Submarine Advanced

G. OTHER APPROPRIATION FUNDS: Not Applicable

H. INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603709N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Mammal Systems
PROJECT NUMBER: S0214 PROJECT TITLE: Advanced Marine Biological Systems

A. (U) RESOURCES: (Dollars in thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0214	Advanced Marine Biological Systems	5,376	5,666	1,868	906	CONT.	CONT.

B. ( ) DESCRIPTION: This program funds training of marine mammals to determine military worth and optimum utility.

C. ( ) PROGRAM ACCOMPLISHMENTS AND PLANS:
1. ( ) FY 1990 Accomplishments:
   a. (U) Continued EX 4 development. Started DT-IIA testing.
   b. ( ) Enhance testing
   c. ( ) Continued
   d. ( ) Began Long Range.
   e. (U) Continued development of Targets of Opportunity (TOO).
2. (U) FY 1991 Program:
   a. (U) Complete OPEVAL on EX 4.
   b. (U) Complete the Tech Data Package for the MK 7 Mod's 0 & 1 PD.
   c. (U) Milestone II decision for projects Arctic, Long Range and TOO.
3. (U) FY 1992 Plans:
   a. (U) Receive AFP decision for EX 4.
   b. (U) Continue open literature surveys under project CHEK.
4. (U) FY 1993 Plans:
   a. (U) Continue open literature surveys under project CHEK.
5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: Naval Ocean Systems Center, Kailua, HI and San Diego, CA. CONTRACTORS: B-K Dynamics; SEACO, Kailua, HI.

E. (U) RELATED ACTIVITIES: None

F. (U) OTHER APPROPRIATION FUNDS:

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT OPN #221	1,680	1,380	3262	3000	CONT.	CONT.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603711N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Fleet TAC D&E Program
PROJECT NUMBER: R0138 PROJECT TITLE: Tactics Development Support

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMP	TOTAL PROGRAM
R0138	Tactics Development Support	6,404	6,594	6,144	5,869	Cont	Cont

B. (U) DESCRIPTION: This program funds the Navy's system for collection, reconstruction and analysis of fleet operational data elements during exercise and real-world operational events in order to evaluate existing tactics and develop new tactics.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:

a. (U) Maintained 14 Tactical Information Management Systems (TIMS) data collection systems for 77 fleet commands for planning, retrieval of lessons learned and data reconstruction and analysis for 219 fleet exercises, operations and projects.

b. (U) Performed 199 installations removals of data collection systems aboard fleet units in support of 60 exercises and operations.

2. (U) FY 1991 PROGRAM:

a. (U) Maintain 14 TIMS and 56 data collection systems in support of 105 fleet commands for analysis of 203 fleet exercises, operations and projects.

b. (U) Perform 215 installation removals of data collection systems in support of 60 fleet exercises.

c. (U) Continue TIMS Upgrade hardware procurement in accordance with CNO approved 5 year plan.

3.(U) FY 1992 PLANS: Continue fleet exercise support using TIMS and installation and removal of data collection systems in support of over 200 fleet exercises for more than 100 fleet commands.

a. (U) Continue CNO approved TIMS Upgrade hardware procurement plan.

4. (U) FY 1993 PLANS: Same as FY 1992 plans above.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVTACSUPPACT, Silver Spring, MD. CONTRACTORS: United Information Management System, Inc., Silver Spring, MD; Summit Research Corp., Gaithersburg, MD.

E. (U) RELATED ACTIVITIES: Program Element 0605155N, Fleet Tactical Development and Evaluation. Funds technical and analytic support to develop/revise fleet tactics for use of various weapons systems and force structures.

F. (U) OTHER APPROPRIATION FUNDS: NONE

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603712N **BUDGET ACTIVITY:** 2
PROGRAM ELEMENT TITLE: Generic Logistics R&D Tech Demo

A. (U) **RESOURCES:** (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
T1816	SHARP	6,924	9,552	9,432	10,698	CONT	CONT
T1884	RAMP	8,065	-	-	-	-	52,603
T1910	IDSS	1,913	4,332	4,397	4,577	CONT	CONT
	TOTAL	16,902	13,884	13,829	15,275	CONT	CONT

B. (U) **DESCRIPTION:** This is a coordinated program to apply advanced technology to logistics needs and problems in order to:

- Design weapon systems and their support to eliminate requirements for large logistics tails.

- Reduce the high cost of maintaining weapon systems and improve readiness.

- Assist program managers with technology to design, deliver, and support weapon systems within shortened development cycles.

- Reduce weapon system repair downtime and develop innovative logistics support systems for contingency operations.

FY 1992/3 RDT&E, NAV ESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603712N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Generic Logistics R&D Tech Demo
PROJECT NUMBER: T1816 PROJECT TITLE: Standard Hardware Acquisition and Reliability Program (SHARP)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
T1816	SHARP	6,924	9,552	9,432	10,698	CONT	CONT

B. (U) DESCRIPTION: SHARP is a hardware standardization project to reduce the development, production and support cost of military electronic weapon systems, while increasing the reliability and readiness of these systems. SHARP develops multi-system, advance electronic hardware standards to provide proven quality and reliability for new systems and existing systems modifications. SHARP specifies standard electronic modules (printed wiring assemblies), standard power supplies, standard batteries, and standard enclosures. The standards are used in multiple electronic systems, thus saving the cost of unique designs and reducing production and support costs. SHARP transitions advanced technology into fleet electronic systems, such as VHSIC, thermal management, composites and photonics to increase readiness and operational availability.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

a. (U) Initiated development of 19 new standard electronic modules (SEM); development of five new standard power supplies (SPS); development of three new standard enclosures (SES); and development of one new standard battery (SBS) for multiple systems applications.

b. (U) Investigated performance of light emitting diodes in military operational environment for application in next generation electronic weapon systems.

c. (U) Investigated use of advanced materials, such as light weight composites and electronics card substrate materials, for SHARP hardware.

2. (U) FY 1991 Program:

a. (U) Initiate development of 25 new SEM, three new SPS, one new avionics SES, and two new SBS for multiple systems applications.

b. (U) Test/evaluate critical fiber optic components and application of cryogenic socketing and multichip packages to electronics card assemblies.

3. (U) FY 1992 PLANS:

a. (U) Initiate development of 25 new SEM; two new shipboard power supplies; three new batteries; one new standard enclosure.

PROGRAM ELEMENT: 0603712N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Generic Logistics R&D Tech Demo
PROJECT NUMBER: T1816 PROJECT TITLE: Standard Hardware Acquisition and Reliability Program (SHARP)

b. (U) Develop and certify one fiber optic module connector.

c. (U) Test and evaluate critical fiber optic components.

d. (U) Evaluate solderless electronics packaging techniques.

e. (U) Evaluate application of chip on board packaging for advanced electronic card assemblies.

4. (U) FY 1993 PLANS:

a. (U) Initiate development of 25 new SEM; two new shipboard power supplies; three new batteries; one new standard enclosure.

b. (U) Develop and certify one fiber optic module connector.

c. (U) Test and evaluate critical fiber optic components.

d. (U) Continue to evaluate solderless electronics packaging techniques.

e. (U) Continue to evaluate advanced technologies and techniques, such as thermal management, VHSIC and composites.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAVIONICCEN, Indianapolis, IN and NAVPWNSUPPCEN, Crane, IN. CONTRACTORS: Numerous small contracts

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) Technology Changes: None.

2. (U) Schedule Changes: None.

3. (U) Cost Changes: None.

F. (U) PROGRAM DOCUMENTATION: NAPDD 3/86

G. (U) RELATED ACTIVITIES: PE0602234N Systems Support Technology (Materials)

H. (U) OTHER APPROPRIATION FUNDS: None.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

PROGRAM ELEMENT: 0603712N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Generic Logistics R&D Tech Demo
PROJECT NUMBER: T1816 PROJECT TITLE: Standard Hardware Acquisition and Reliability Program (SHARP)

J. (U) MILESTONE SCHEDULE:

MILESTONE	FY90	FY91	FY92	FY93
Rad Event Det	PDR	CDR		QUAL
Line Replaceable Multichip Pkg			PDR	CDR
Std Controller Card Set		PDR	CDR	QUAL
Light Weight Avionics Rack			PDR	CDR
Fiber Optic Connector		PDR	CDR	QUAL
Fiber Optic Interface Card			PDR	CDR
RF Module Set				PERF SPEC

(PDR= Preliminary Design Review, CDR= Critical Design Review, QUAL= Qualification of Item, PERF SPEC= Performance Specification)

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603712N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Generic Logistics R&D Tech Demo
PROJECT NUMBER: T1910 **PROJECT TITLE:** Integrated Diagnostic Support System (IDSS)

C. (U) DESCRIPTION: The purpose of this project is to apply advanced automated technology to weapon system design and diagnostics to increase system availability and decrease repair costs. The IDSS project develops and demonstrates an integrated set of diagnostic tools which improve weapon system testability and improve shipboard capability for trouble shooting of system failures. IDSS provides a design / logistics interface to reduce weapon system life cycle costs and logistics dependency.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: (a) Completed acceptance testing of the Adaptive Diagnostic Subsystem (ADS). (b) Continued development of the diagnostic authoring tool. (c) Initiated development of user guidance documentation for the ADS. (d) Continued development of the feedback analyzer.

2. (U) FY 1991 Program: (a) Develop user guidance documentation for the diagnostic authoring tool. (b) Incorporate the USAF authoring presentation system (APS) software into the technical information authoring tool. (c) Complete development/integration of the diagnostic tools. (d) Develop diagnostic subsystem interfaces for system demonstration. (e) Complete documentation of tools and interface specifications. (f) Prepare item under test (IUT) test bed for IDSS system demonstration.

3. (U) FY 1992 Plan: (a) Continue demonstration of IDSS on a major weapon system IUT. (b) Initiate development of military standards and design guides for institutionalization of IDSS in the weapon system design and acquisition process. (c) Evaluate incorporation of relational data base technology into each IDSS tool.

4. (U) FY 1993 Plan: (a) Complete the IDSS system level demonstration. (b) Develop real-time equipment performance, prognostication and diagnostic capabilities. (c) Initiate laboratory and shipboard prognostication performance evaluation on two representative weapons systems.

5. (U) Program to Completion: This is a continuing program.

E.(U) WORK PERFORMED BY: IN-HOUSE: NAVSWC Dahlgren, VA. CONTRACTORS: Harris Corp./GSSD, Syosset, NY; GAI Inc., Sparta, NJ

F.(U) RELATED ACTIVITIES: Sharing software with PE 0603106F (Log Sys Tech) project Integrated Maintenance Information System (IMIS).

G.(U) OTHER APPROPRIATION FUNDS: None.

H.(U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603713N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ocean Engineering Technology Development

A. (U) **RESOURCES:** (Dollars in thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
M0099	Deep Submergence Biomedical Development	6,034	6,600	6,603	6,659	CONT.	CONT.
S0396	Deep Depth Diving	1,053	0	0	0	0	5,885
S0397	Deep Ocean Technology	7,144	7,347	6,943	6,467	CONT.	CONT.
	TOTAL	14,231	13,947	13,546	13,126		

B. (U) **DESCRIPTION:** Developments in this program will enable the U.S. Navy to overcome deficiencies which constrain deep ocean operations in the areas of search, location, rescue, recovery, salvage, underwater construction, and protection of offshore assets. This program develops the medical technology, the diver life support equipment and the vehicles, systems and tools to permit manned and unmanned underwater operations to depths of 20,000 feet (98% of the ocean bottom).

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603713N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Ocean Engineering Technology Development
PROJECT NUMBER: M0099 **PROJECT TITLE:** Deep Submergence Biomedical Development

C. (U) **DESCRIPTION:** Develops biomedical technology to increase diver safety and effectiveness for current operations, and supports deeper, longer, safer dives.

D. (U) **PROGRAM ACCOMPLISHMENTS AND PLANS:**

1. (U) FY 1990 ACCOMPLISHMENTS:
   a. (U) Completed prototype non-invasive tissue bubble detector
   b. (U) Delivered improved criteria for chemical purity of divers gas
   c. (U) Recommended protocol that minimizes brain damage after acute gas embolism
   d. (U) Developed new decompression tables for long, low pressure dives
   e. (U) Wrote manual of chamber atmosphere control, monitoring, and decontamination
2. (U) FY 1991 PROGRAM:
   a. (U) Deliver interim medical recommendations for submarine rescue
   b. (U) Recommend improved intermittent oxygen exposure pattern
   c. (U) Deliver new air and nitrox decompression tables for NAVSEA
   d. (U) Wrote new diet & hydration guidelines for cold, strenuous dives
3. (U) FY 1992 PLANS:
   a. (U) Validate models that predict effects of underwater breathing apparatus characteristics on diver performance
   b. (U) Deliver selection criteria for diver thermal protection gear to NAVSEA
   c. (U) Deliver updated diver training and work schedules to NAVSEA
   d. (U) Write comprehensive human oxygen toxicity risk model
   e. (U) Describe quantitative effects of increased oxygen tension on saturation decompression rates
   f. (U) Deliver risk based heliox decompression tables to NAVSEA
4. (U) FY 1993 PLANS:
   a. (U) Write model of bends likelihood that enables real-time decompression schedules for any predetermined risk
   b. (U) Write physiologically based model for saturation excursion and decompression
   c. (U) Describe quantitative effects of swim stroke and gear on diver efficiency
   d. (U) Perform trials of a new treatment for bends
5. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) **WORK PERFORMED BY:** IN-HOUSE: NAVMEDRSCHINSTITUTE, Bethesda, MD and NAVSUBMEDRSCHLAB, New London, CT. CONTRACTORS: Various Universities.

F. (U) **RELATED ACTIVITIES:** Program Element 0603722N, (Naval Special Warfare), in conjunction with USSOCOM,

G. (U) **OTHER APPROPRIATION FUNDS:** N/A

H. (U) **INTERNATIONAL COOPERATIVE AGREEMENTS:** Cooperative MOU between US-France, US-UK, US-Australia.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603713N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Ocean Engineering Technology
PROJECT NUMBER: S0397 **PROJECT TITLE:** Deep Ocean Technology

C. (U) **DESCRIPTION:** The objective of this project is to identify and develop critical vehicle technologies required for the Navy to function effectively in the deep ocean environment to depths of 20,000 feet.

D. (U) **PROGRAM ACCOMPLISHMENTS AND PLANS:**

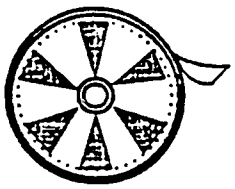
1. (U) FY 1990 Accomplishments:
   a. (U) Completed ATV (Advanced Tethered Vehicle) long duration (greater than 24 hrs) 20,000 foot working dive.
   b. (U) Initiated at-sea testing of AUSS (Advanced Unmanned Search System).
   c. (U) Completed upgrade of AUSS search sensors.
   d. (U) Conducted AUSS acoustic data link testing to 20,000 foot depth.
   e. (U) Initiated robotic work system and deep recovery device development for ATV system.
   f. (U) Completed successful ATV open-ocean (20,500 ft. depth, 10 hours bottom time) certification dive.
2. (U) FY 1991 Program:
   a. (U) Complete ATV deep ocean bottom work testing.
   b. (U) Complete formal ATV fleet turnover.
   c. (U) Conduct deep ocean (20,000 ft. depth) AUSS Test.
   d. (U) Complete data suppression program to allow near real time acoustic (TV and sonar) transmission through water column for AUSS.
   e. (U) Continue robotic work system and deep recovery device development for ATV system.
   f. (U) Complete feasibility of operating multi AUSS vehicles simultaneously from same support ship.
3. (U) FY 1992 Plans:
   a. (U) Conduct at-sea Development Test (DT) of AUSS following various underwater search scenarios
   b. (U) Establish AUSS effectiveness (probability to find objects) as undersea search system
   c. (U) Continue development of robotic work system for ATV
   d. (U) At-sea test of deep recovery device operated from ATV
   e. (U) Conduct at-sea tests to demonstrate feasibility and effectiveness of multi AUSS operating simultaneously
4. (U) FY 1993 Plans:
   a. (U) Complete Technical Evaluation TECHEVAL of AUSS
   b. (U) Complete operational Evaluation (OPEVAL) of ATV robotic work system
   c. (U) Complete development of deep recovery device
5. (U) Program to Completion:
   c. (U) This is a continuing program.

E. (U) **WORK PERFORMED BY:** IN-HOUSE: David Taylor Research Center, Bethesda, MD; Naval Ocean Systems Center, San Diego, CA. CONTRACTORS: Various competitive contracts.
F. (U) **RELATED ACTIVITIES:** PE 0603702N Ocean Engineering Systems Development.
G. (U) **OTHER APPROPRIATION FUNDS:** N/A
H. (U) **INTERNATIONAL COOPERATIVE AGREEMENT:** N/A.

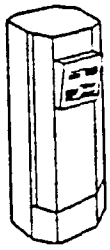
FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603717N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Command and Control Systems (Adv)
PROJECT NUMBER: X1743 **PROJECT TITLE:** Command and Control Processor (C2P)

C2P COMPUTER PROGRAM



AN/UYK-43



USQ-69



POPULAR NAME: Command and Control Processor (C2P)

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	To Complete
Program Milestones			NPDM IIIA		NPDM IIIB
Engineering Milestones		FQR(V0)	FQR(V1)		
T&E Milestones	TRR V0	OT-IIA OPEVAL(V0)		OPEVAL(V1)	
Contract Milestones	Definitize CPIF Contract				

BUDGET ($K)	FY 1990	FY 1991	FY 1992	FY 1993	Program Total (To Complete)
Major Contract	3,973	2,238	2,573	2,359	35,575 (915)
Support Contract	651	669	675	675	6,157 (260)
In-House Support	577	606	621	536	4,583 (530)
GFE/ Other	4,542	3,375	3,400	1,731	40,295 (150)
Total	9,743	6,888	7,269	5,301	86,610 (1,855)

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603717N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Command and Control Systems (Adv)
PROJECT NUMBER: X1743 PROJECT TITLE: Command and Control Processor (C2P)

B. (U) DESCRIPTION:

(U) The Command and Control Processor will remove link translation and processing duties from the tactical data processor, thereby increasing track capacity and target insertion rates for the combat direction system. The C2P will be a newly developed computer program hosted on Navy standard computers (AN/UYK-43) that will serve as the interface between tactical digital communication systems and selected shipboard processors, providing a rapid and flexible capability for exchanging tactical information. Where installed, the C2P will isolate all tactical data link equipment, message standards and protocols from tactical information processors. The C2P provides the interface between Links 4A, 11, Improved Link 11, 16, the Advanced Combat Direction System (ACDS), and AEGIS Command and Decision (C&D). The C2P will extract information from Tactical Digital Information Links (TADILs), translate between TADILs, forward data between specific TADILs and provide the information derived from those links to on-board processors. Information received from shipboard processors will be formatted and provided to the appropriate link equipment for transmission. The C2P program is being developed in two versions. Version 0 will support ACDS Block 0 and AEGIS Model 4 C&D ships. Version 1 will support ACDS Block 1 and AEGIS Model 5 C&D ships.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. (U) Conducted initial Test Requirements Review (TRR) (OT-IIA)
   b. (U) Began initial Government Acceptance Test
   c. (U) Continued software coding and CDT&E
   d. (U) Conducted second Test Requirements Review (Version 0)
   e. (U) Conducted ship system ashore integration testing (Version 0)
2. (U) FY 1991 Program:
   a. (U) Conduct Technical Evaluation (Version 0) (DT-IIB)
   b. (U) Conduct Operational Evaluation (Version 0)
   c. (U) Complete software coding (Version 1)
   d. (U) Conduct Government Acceptance Tests (Version 1)
   e. (U) Conduct multi-ship integration testing (Version 1) at shore based test site
3. (U) FY 1992 Plans:
   a. (U) Release to Fleet (RTF) C2P Version 0
   b. (U) Initiate Technical Evaluation (Version 1) (DT-IIC)

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603717N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Command and Control Systems (Adv)
PROJECT NUMBER: X1743 **PROJECT TITLE:** Command and Control Processor (C2P)

4. (U) FY 1993 Plans:
   a. (U) Complete Technical Evaluation (Version 1)
   b. (U) Conduct Operational Evaluation (Version 1)
   c. (U) C2P Version 0 IOC

5. (U) Program to Completion:
   a. (U) Release to Fleet (RTF) C2P Version 1
   b. (U) C2P Version 1 IOC

D. (U) WORK PERFORMED BY: IN-HOUSE: FLTCOMBATDIRSSACT, San Diego, CA; NAVOCEANSYSCEN, San Diego, CA; FLTCOMBATDIRSSACT, Dam Neck, VA. CONTRACTORS: Hughes Aircraft Company, Fullerton, CA.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET

1. (U) TECHNICAL CHANGES: None

2. (U) Schedule Changes: None

3. (U) Cost Changes: None

F. (U) PROGRAM DOCUMENTATION:

1. (U) OR, 12/85
2. (U) NDCP, 2/88 (Revised 11/89)
3. (U) TEMP 357-2, 10/89

G. (U) RELATED ACTIVITES:

(U) Program Element 0205604N, Tactical Information System (JTIDS): LINK 16 is one of the tactical data links currently under development that interfaces with C2P.

(U) Program Element 0604518N, CIC Conversion (ACDS): ACDS is a shipboard processor currently under development that interfaces with C2P.

H. (U) OTHER APPROPRIATION FUNDS: (Quantity/Dollars in Thousands)

(U) PROCUREMENT

	FY 1990 Actual	FY 1991 Estimate	FY 1992 Estimate	FY 1993 Estimate	To Complete	Total Program
OPN (BA2)	0	8/9,245	10/11,835	9/12,819	Cont.	Cont.
OPN (BA8)	0	1,883	1,757	1,044	Cont.	Cont.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None

J. (U) TEST AND EVALUATION DATA: Not applicable to this submission

FY 1992 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603717N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Command and Control (C2) Systems (Adv)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X1743	C2 Processor	9,743	6,888	7,269	5,301	1,855	86,610
X1753	Link 11 Impv	9,168	14,349	891	979	N/A	55,491
TOTAL		18,911	21,237	8,160	6,280	1,855	142,101

B. (U) BRIEF DESCRIPTION OF ELEMENT:

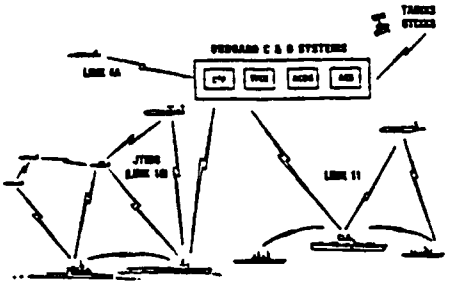
This program element develops the Command and Control Processor (C2P) and Link 11 Improvements (LEI).

The C2P project uses Non-Developmental Item (NDI) acquisition of standard Navy computers (AN/UYK-43) and develops software programs to interface between tactical digital communication systems and selected shipboard processors. The processor will provide translation between TADILs A, C and J and isolate all tactical data link communications equipment, message standards and protocols from tactical information processors. This will provide a flexible capability for rapidly exchanging tactical information using a single universal database for translating various link formats while remaining completely independent of communications equipment and tactical data computing systems.

The Link 11 Improvement Program (LEIP) is made up of several efforts to improve existing computer-to-computer digital radio communications in the HF and UHF radio frequency bands among Combat Direction System (CDS) equipped ships, submarines, aircraft and shore sites. Near term efforts include improvements in interoperability, reliability, and connectivity among users. Expansion of Link 11 use to non-CDS ships and other platforms and sites is included. Data link improvements will allow more effective employment of fleet units by increasing the timeliness, accuracy, and content of tactical data transfer. In order to ensure interoperability, the U.S. is the Lead Technical Nation to the NATO Improved Link Eleven (NILE) Office.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603717N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Command and Control Systems (Adv)
PROJECT NUMBER: X1753 **PROJECT TITLE:** Link Eleven Improvement



POPULAR NAME: Link Eleven Improvement Program (LEIP)

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	To Complete
Program Milestones	IANC SDR		LEDS MS II	LEDS MS III	FIELD LEDS
Engineering Milestones	4 LEDS PROTOTYPES	LEDS SPEC IANC S/W			
T&E Milestones	TEST LEDS PROTOTYPES	MULTS OT			
Contract Milestones	CONTRACT MULTS V 1				

BUDGET ($000)	FY 1990	FY 1991	FY 1992	FY 1993	Program Total (To Complete)
Major Contract	3,887	3,060	300	300	14,523 (N/A)
Support Contract	986	1,840	350	350	6,959 (N/A)
In-House Support	2,592	5,252	200	300	17,143 (N/A)
GFE/ Other	1,703	4,197	41	29	11,473 (N/A)
Total	9,168	14,349	891	979	50,098

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603717N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Command and Control Systems (Adv)
PROJECT NUMBER: X1753 **PROJECT TITLE:** Link Eleven Improvement

B. (U) DESCRIPTION:

(U) The Link-11 Improvement Program (LEIP) is made up of several efforts. These include near term improvements to existing Link-11, technical support of the NATO efforts to develop a long range program for an improved Link-11 system, and development of a data link for use with non-Link-11 equipped foreign navies, and a Critical System Demonstration of technologies to improve the performance of current Link-11. LEIP improves existing computer-to-computer digital radio communications in the HF and UHF radio frequency bands among Combat Direction System (CDS) equipped ships, submarines, aircraft and shore sites. Near term improvements include training initiatives (including a Navy Training Plan), upgraded interoperability testing capabilities, diagnostic upgrades, software enhancements for data terminal sets, OPSPEC upgrades for the TDS/CDS, a Link-11 SATCOM project initiative, a Mobile Universal Link Translator System (MULTS), a Link Eleven Display System (LEDS) (including a low cost Link-11 terminal with versions capable of forwarding data) and the Inter-American Naval Conference (IANC) Data Link, "Link America". These data link improvements will allow more effective employment of fleet units by increasing the timeliness, accuracy, and content of tactical data transfer. In order to ensure interoperability, the U.S. is the lead technical nation to the NATO Improved Link Eleven (NILE) office.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. (U) Developed MULTS Version 1 prototypes.
   b. (U) Completed concept exploration phase of Satellite Link-11.
   c. (U) Continued Link-11 training initiatives.
   d. (U) Fielded prototype stand-alone Link-11 system under LEDS.
   e. (U) Demonstrated concept of IANC data link interface to Link-11.
   f. (U) Conducted System Design Review (SDR) and Program Design Review (PDR) for IANC data link.
   g. (U) Produced software upgrades to the programmable Data Terminal Sets (DTS).
   h. (U) Provided technical engineering support to the NILE office.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603717N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Command and Control Systems (Adv)
PROJECT NUMBER: X1753 PROJECT TITLE: Link Eleven Improvement

2. (U) FY 1991 Program:
   a. (U) Field two MULTS Version 1 prototypes
   b. (U) Field prototype of LEDS with data forwarding
   c. (U) Field prototype of LEDS with SATLINK capability
   d. (U) Conduct Critical Design Review (CDR) for IANC data link
   e. (U) Commence development of a data link Navy Training Plan (NTP)
   f. (U) Software upgrades to the programmable DTS
   g. (U) Provide technical engineering support to the NILE office
   h. (U) Conduct Operational Testing (OT) of MULTS Version 1
   i. (U) Conduct a Critical System Demonstration of the Link-11 Single Tone waveform
   j. (U) Field Mults Unit #3 with version 2 software

3. (U) FY 1992 Plans:
   a. (U) Field prototype of LEDS with all previously developed capabilities plus link diagnostics functions

4. (U) FY 1993 Plans:

   a. (U) Complete formal documentation of LEDS prototype software
   b. (U) Complete testing and certification of LEDS
   c. (U) Milestone III for LEDS

5. (U) Program to Completion: Program transitions to O&M,N funded system/software maintenance.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVELEXCEN, Portsmouth, VA; NAVOCEANSYSCEN, San Diego, CA; NRL, Washington, D.C.; NTISA, San Diego, CA; NAVELEXACT, St. Inigoes, MD; FLTCOMBATDIRSSACT, Dam Neck, VA. CONTRACTORS: Applied Physics Laboratory/Johns Hopkins University; TRACOR, California, MD.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603717N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Command and Control Systems (Adv)
PROJECT NUMBER: X1753 PROJECT TITLE: Link Eleven Improvement

E. (U) COMPARISON WITH REVISED FY 1991 PRESIDENT'S BUDGET:

1. (U) Technology Changes: None.

2. (U) Schedule Changes: None.

3. (U) Cost Changes: None.

F. (U) PROGRAM DOCUMENTATION:

1. (U) OR X1327 (LEIP), Feb 82
2. (U) DCP (HFAJ/LEIP), Jan 87
3. (U) TEMP (HFAJ/LEIP), Jan 86

G. (U) RELATED ACTIVITES: None.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

(U) *PROCUREMENT:*

	FY 1990 Actual	FY 1991 Estimate	FY 1992 Estimate	FY 1993 Estimate	To Complete	Total Program
OPN #93	1,210	954	1,130	909	0	4,203
OPN (BA8)	105	72	0	0	0	177

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS:

1. (U) The NATO Improved Link Eleven (NILE) program is in project definition under a Memorandum of Understanding effective November 1987. Participating nations include: Canada, France, Italy, Germany, Netherlands, Spain, the United Kingdom and the United States.

2. (U) The Inter-American Naval Conference (IANC) includes: Argentina, Bolivia, Brazil, Chile, Ecuador, Mexico, Panama, Paraguay, Peru, Uruguay, Venezuela and the United States.

J. (U) TEST AND EVALUATION DATA: Not applicable to this submission.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603719N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: CONTAINER OFFLOADING AND TRANSFER SYSTEM
PROJECT NUMBER: Y0816 **PROJECT TITLE:** ELEVATED CAUSEWAY (MODULAR)

A. (U) RESOURCES: (Dollars in thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY1991 ESTIMATE	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Y0816	ELCAS(M)	0	0	1,003	0	0	1,003

B. (U) DESCRIPTION: This project accomplishes Technical Evaluation and Operational Evaluation of the modular Elevated Causeway (ELCAS (m)) in preparation for a Milestone III decision. The ELCAS (m) is a 3000 foot causeway erected by the Naval Beach Group in a Logistics-Over-The-Shore environment, transported and offloaded by T-ACS (Auxiliary Crane Ship), and made up of container-sized (8 foot x 40 foot x 4.5 foot) pontoons.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:
   Not Applicable.

2. (U) FY 1991 PROGRAM:
   Not Applicable.

3. (U) FY 1992 PLANS:
   Technical evaluation/Operational evaluation of ELCAS (m).
   Support Milestone III Navy Program Decision Meeting.

4. (U) FY 1993 PLANS:
   Not Applicable.

5. (U) PROGRAM TO COMPLETION:
   Not Applicable.

D. (U) WORK PERFORMED BY: IN-HOUSE: Naval Civil Engineering Laboratory, Port Hueneme, CA CONTRACTORS: None

E. (U) RELATED ACTIVITIES:
   Not Applicable.

F. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY1991 ESTIMATE	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
AMPHIBIOUS EQUIPMENT						
(U) OPN:	0	0	0	0	0	0

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS:
   NOT APPLICABLE

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603720N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Education and Training
PROJECT NUMBER: R1772 PROJECT TITLE: Education and Training Development

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R1772	Ed.& Tra Dev.	5,197	5,958	6,106	6,150	Cont.	Cont.

B. (U) DESCRIPTION: Applies automation and expert systems to the development, presentation, management, and evaluation of Navy training. Technology areas include artificial intelligence, training aids, automated performance testing and computerized delivery systems.
C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:
1. (U) FY 1990 ACCOMPLISHMENTS:
a. (U) Tested computerized system to help technical experts author instructional materials for new/revised training.
b. (U) Delivered low-cost, computer-based, graphically enriched 1200 PSI propulsion trainer to Naval Reserve sites.
c. (U) Delivered desk-top computer-based educational software system to develop curriculum and performance tests.
2. (U) FY 1991 PROGRAM:
a. (U) Accelerate remedial skill enhancement program. Develop curriculum to train AN/SLQ-32 EW operators to overcome information overload to rapidly identify threat signals.
b. (U) Deliver expert system to enhance allocation and coordination of fleet and shore training resources, and continue prototyping a career development training management system. Develop training methods to reduce shipboard accidents.
3. (U) FY 1992 PLANS: Apply individual skill training technologies to team training. Test automated training materials development tools on technical manual development.
4. (U) FY 1993 PLANS: Apply artificial intelligence tutoring to computer-based instructional systems. Develop method to link training resource allocation to operational readiness.
5. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVPERSRANDCEN, San Diego, CA. CONTRACTORS: Instructional Science & Design, San Diego, CA.

E. (U) RELATED ACTIVITIES: Program Elements 0604722S, Education and Training Systems Development; 0603007A, Human Factors, Personnel and Training Technology; 0602233N, Mission Support Technology; and 0604703N, Manpower, Personnel, Training, Simulation, and Human Factors.
F. (U) OTHER APPROPRIATION FUNDS: Non-acquisition program.
G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603721N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: ENVIRONMENTAL PROTECTION

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY1990 ACTUAL	FY1991 ESTIMATE	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMP.	TOTAL PROG.
S0400	ORDNANCE RECLAMATION	430	482	542	594	CONT.	CONT.
S0401	SHIPBOARD WASTE MANAGEMENT	8,855	9,121	23,759	25,097	CONT.	CONT.
Y0817	POLLUTION ABATEMENT ASHORE	1,806	1,569	1,532	1,704	CONT.	CONT.
T2042	PLASTIC REMOVAL IN MARINE ENVIRONMENT	0	307	310	154	CONT.	CONT.
TOTAL		10,791	11,479	26,143	27,549		

B. (U) DESCRIPTION: This program develops processes, prototype hardware, systems and operational procedures that will allow the Navy to operate in the U.S., foreign and international waters, air, space, and land areas while complying with U.S. statutes and international agreements and to improve the Navy's response to salvage-related pollution incidents. Projects support the Navy's requirement to meet environmental standards outlined by EPA, Executive Order 12088 of October 1978, and DoD Directive 6050.15 of 14 July 1985. The technology developed will permit the Navy to comply with present and future regulations in a cost-effective manner without impairing the military readiness of operational units. The program solicits technology from industry, evaluates breadboard units in the laboratory, and develops prototype equipment for technical and operational evaluation in Navy platforms and facilities. Duplication of effort within the Navy and Department of Defense is avoided through close liaison among the Navy system commands and with DoD and other federal agencies. International cooperation and information exchange is achieved with allied nations through direct liaison with NATO-sponsored international symposia.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603721N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: ENVIRONMENTAL PROTECTION
PROJECT NUMBER: S0400 PROJECT TITLE: ORDNANCE RECLAMATION

C. (U) DESCRIPTION: Project enables Navy field activities to comply with environmental laws and standards and provides economically and environmentally acceptable techniques for disposing of the vast amount of ordnance and its energetic contents which is accumulating at field activities. The preferred method is reclamation, but for those items where this would not be feasible (those containing carcinogens), safe disposal techniques will be developed. Project will also minimize the environmental effects of essential test explosions.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:
   a. (U) Completed initial studies on reformulation of Plastic Bonded Explosive (PBX) materials. Installed and verified operation of robot and bench-scale equipment for energetic material extraction.
2. (U) FY 1991 PROGRAM: Continue development of PBX solvent extraction, flare material incinerator and air monitoring technology. Monitor seaturtle and marine mammal field tests.
3. (U) FY 1992 PLANS:
   a. (U) Continue development of PBX solvent extraction pilot plant and dye marker incineration technology.
4. (U) FY 1993 PLANS:
   a. (U) Continue PBX solvent extraction plant and dye marker reformulation, and other ordnance reclamation technology.
5. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: Naval Surface Warfare Center, Dahlgren, VA; Naval Ocean Systems Center, San Diego, CA; Naval Weapons Support Center, Crane, IN; Naval Weapons Center, China Lake, CA. CONTRACTORS: Los Alamos National Labs; University of Missouri (Rolla, MS), El Dorado Engineering (Salt Lake City, Utah)

F. (U) RELATED ACTIVITIES: P.E. 0603609N Conventional Munitions

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603721N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: ENVIRONMENTAL PROTECTION
PROJECT NUMBER: S0401 PROJECT TITLE: SHIPBOARD WASTE MANAGEMENT

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMP.	TOTAL PROG.
S0401	Shipboard Waste Management	8,855	9,121	23,759	25,097	CONT.	CONT.

B. (U) DESCRIPTION: Project develops equipments and procedures for managing all shipboard waste problems. Emphasis is on developing shipboard systems for compliance with national, state, and international regulations and on achieving a pollution-free profile for future ships. This program will develop conservation and ozone-safe replacement chemical technology for Navy solvents and shipboard refrigeration and firefighting systems.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS

1. (U) FY 1990 ACCOMPLISHMENTS:
   a. (U) Completed: SHIPEVAL of shipboard vertical trash compactor (SVTC); LABEVAL of high-flow in-tank oil/water separator (ITOWS); and LABEVAL of high-capacity oil content monitor (OCM).
   b. (U) Issued Uniform Industrial Process Instruction (UIPI) for organotin (OT) paint removal and monitored selected Navy harbors; investigated advanced technologies for graywater and blackwater management.
   c. (U) Evaluated shipboard medical waste processing (MWP), reclamation of Chloroflurocarbons (CFCs), and subetitute ozone-safe CFCs; designed plastics waste processor (PWP); completed shipboard plastics waste survey.
   d. (U) Completed LABEVAL of prototype solid waste pulper (SWP) and laser sampling detection and survey systems; SHIPEVAL of offship firefighting system.

2. (U) FY 1991 PROGRAM:
   a. (U) Received approval for limited production for SVTC; install high-flow ITOWS; SHIPEVAL of emulsion-breaking Oil Water Separator (OWS) and SWP.
   b. (U) LABEVAL of CFC reclamation and ozone-safe CFCs and of graywater and blackwater treatment systems.
   c. (U) Design low-flow OWS, MWP, and graywater minimization systems.
   d. (U) Fabricate laser sampling system and monitor OT at Navy harbors.
   e. (U) LABEVAL and TECHEVAL of Solid Waste Pulper and LABEVAL of prototype Plastics Waste Processors

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603721N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: ENVIRONMENTAL PROTECTION
PROJECT NUMBER: S0401 PROJECT TITLE: SHIPBOARD WASTE MANAGEMENT

3. (U) FY 1992 PLANS:

a. (U) OPEVAL of SVTC and SWP; SHIPEVAL of small-craft OWS, CFC reclamation; TECHEVAL of high-flow ITOWS and laser sampling system.

b. (U)Design graywater and blackwater shipboard treatment systems; fabricate graywater minimization system.

c. (U) Design specifications for emulsion-breaking OWS and open-sea OWS salvage system; monitor OT at Navy harbors.

d. (U) Initiate development of HALON and Chlorofluorocarbon (CFC) substitution and conservation technology to comply with the requirements of the Montreal Protocol, EPA regulations, DoD directive 6050.9, OPNAVINST 5090.2 and SECNAVINST 5090.5 .

e. (U) Complete LABEVALS of prototype and initiate design of Shipboard PWP

f. (U) Begin/transition development of non-cfc centrifugal air conditioning refrigerant and compressor technology. Monitor design and fabrication of York twin screw AC plant contract for surface combatants. Determine compatibility of ether in aircraft carrier centrifugal units and develop R-124 impeller design, obtain performance maps of E-134 and R-124 impeller designs. Begin development of non-cfc refrigeration cycles.

4. (U) FY 1993 PLANS:

a. (U) Receive approval for full production (AFP) for SVTC and SWP; OPEVAL of high-flow ITOWS; TECHEVAL of PWP.

b. (U) SHIPEVAL of MWP and graywater minimization; fabrication graywater and blackwater shipboard treatment systems.

c. (U) Issue specifications for small-craft OWS and for CFC reclamation and ozone-safe CFCs; continue salvage system developments; design OWS polisher.

d. (U) Continue development of Non-CFC and conservation technology to phase out ozone-depleting CFCs and HALONS now used as shipboard refrigerants, solvents, and fire extinguishing agents.

e. (U) Continue development of alternative non-cfc refrigeration cycles for shipboard refrigeration service and alternative refrigerants, impeller designs for back fit. Begin testing and qualification of twin-screw contract unit for surface combatants.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY:
IN-HOUSE: DTRC, NOSC
CONTRACTORS: SOMAT (Pomeroy, CA); NKF (Fairfax, VA); Battelle Pacific Northwest Labs (Richland, WA); SAN-I-PAK (Tracy, CA); Johns Hopkins University (Baltimore, MD); ARTECH (Chantilly, VA); J.J. McMullen (Arlington, VA); Omega Recovery Service (Whittier, CA); GKY & Assoc. (Springfield, VA); PROTECTOR, Inc. (Severna Park, MD); George G. Sharp, Inc. (Arlington, VA); NACI (Washington, DC); MAR (Severna Park, MD).

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603721N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: ENVIRONMENTAL PROTECTION
PROJECT NUMBER: S0401 PROJECT TITLE: SHIPBOARD WASTE MANAGEMENT

E. COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGE: The development of CFC and HALON conservation and replacement chemical technology has been added as an FY 1992 start to comply with the requirements of the Montreal Protocol, EPA regulations, DoD directive 6050.9, OPNAVINST 5090.2 and SECNAVINST 5090.5.
2. (U) SCHEDULE CHANGES: Not applicable.
3. (U) COST CHANGES: $15.2M and $16.6M have been added in FY 1992 and 1993 to develop technology for CFC and HALON conservation and replacement.

F. (U) PROGRAM DOCUMENTATION

TEMP 067-1E	Jun 87	In-Tank Oil/Water Separator (ITOWS)
TEMP 067-6	Dec 87	Small Craft OWS
TEMP 067-2	Feb 81	Oil Content Monitor
TEMP 067-1	Mar 81	Advanced Oily Waste Treatment
TEMP 013-2	Jan 89	Laser Detection & Sampling System
TEMP 013-12	Feb 87	Vertical Trash Compactor
TEMP 013-26	Apr 88	Solid Waste Pulper
TEMP 013-27	May 88	Offship Firefighting Systems
NAPDD	May 86	CHT Tank Degreasing
NAPDD	May 86	GRP Soil Drain Evaluation
NAPDD	Oct 88	Advanced Non-Oily Waste Treatment
NAPDD	Oct 88	Advanced Solid Waste Control
NAPDD	May 86	Organotin Waste Treatment
NAPDD	Oct 88	Shipboard Hazardous Waste
NAPDD	Oct 87	Ship Air Emissions/VOCs

G. (U) RELATED ACTIVITIES: PE 0602233N Mission Support, PE 0603513N Shipbuild System Comp Development
H. (U) OTHER APPROPRIATION FUNDS: Not applicable.
I. (U) INTERNATIONAL AGREEMENTS: Not applicable.
J. (U) MILESTONE SCHEDULE: Category IIIA (AFP) milestones for the following programs are as follows:

Small Craft OWS	2Q91
High Flow ITOWS	2Q91
Shipboard Vertical Trash Compactor	1Q93
Solid Waste Pulper	1Q93
Offship Firefighting System	1Q93
Laser Detection and Sampling System	2Q93
NAPDDs	Various

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603721N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: ENVIRONMENTAL PROTECTION
PROJECT NUMBER: Y0817 PROJECT TITLE: POLLUTION ABATEMENT ASHORE

C. (U) DESCRIPTION: This project develops cost-effective systems and equipment which permit shore establishments to comply with applicable federal, state, and local environmental laws and regulations.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:
   a. (U) Developed fiber optic sensors (FOS) for toxic metals and organics method to estimate Aqueous Fire Fighting Foam (AFFF) levels specifications and alkyds and epoxies and prototype monitor for lead in water.
   b. (U) Completed portable environmental test system.
   c. (U) Evaluated technologies to assess/control non-point source discharges and in-situ storage tank leak detectors. Assessed requirements for bio-monitoring protocols.

2. (U) FY 1991 PROGRAM:
   a. (U) Develop technology application plan for replacing chrome in aircraft maintenance, drinking water pipe lead liner and evaluate biological pink water treatment, complete evaluation of wetlands for controlling/mitigating non-point source runoff. Develop specifications for NOx control technologies.

3. (U) FY 1992 PLANS:
   a. (U) Continue development of pollution abatement technology for NOx control and wetland runoff control. Perfect drinking water lead liner. Develop mass vice volume technology for fuel leak detection.

4. (U) FY 1993 PLANS: Continue development of sensors, low cost bioassays, and control of non-point source runoff.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED AT:
IN-HOUSE: NOSC, NCEL, NADC, DTRC, NRL
CONTRACTORS: University of Oklahoma (Norman, OK), DART (Oxnard, CA), Computer Science Corp. (San Diego, CA), San Diego State University (San Diego, CA)

F. (U) RELATED ACTIVITIES: PE 060223N (Mission Support)
G. (U) OTHER APPROPRIATION FUNDS: Not Applicable
H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603721N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: ENVIRONMENTAL PROTECTION
PROJECT NUMBER: T2042 PROJECT TITLE: PLASTIC REMOVAL IN MARINE ENVIRONMENT

C. (U) DESCRIPTION: The purpose of this project is to investigate methods to reduce or eliminate plastic material from items going aboard Navy ships to assist the fleet in complying with Annex V to the International Convention for the Prevention of Pollution from Ships (MARPOL). MARPOL was ratified by Congress and signed into law by the President on 29 December 1987.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS

1. (U) FY 1990 ACCOMPLISHMENTS: Not applicable.

2. (U) FY 1991 PROGRAM: Research materials and processes to reduce the volume of plastic material going aboard Navy ships. Conduct laboratory and fleet testing.

3. (U) FY 1992 PLANS: Continue to research and evaluate alternatives to plastics. Implement changes to products and technology as identified.

4. (U) FY 1993 PLANS: Continue to evaluate proposed alternatives to plastics. Implement changes as identified.

5. (U) PROGRAM TO COMPLETION: Ensure continued industry participation in plastic-free efforts to assist fleet in compliance with MARPOL regulations. Continue to implement changes as identified. This is a continuing program.

E. (U) WORK PERFORMED BY:
IN-HOUSE: NRL, Natick Research and Development Center (Natick, MA), DTRC, Annapolis, MD.
CONTRACTORS: To be determined.

F. (U) RELATED ACTIVITIES: PE 06023322N (Mission Support), PE 06021786 (DOD Food Program)

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) O&M,N	808	1,301	1,300	1,299	CONT.	CONT.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603724N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: NAVY ENERGY PROGRAM (ADV)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0829	ENERGY CONSERVATION (ADV)	2,489	3,156	2,812	3,016	Cont.	Cont.
R0838	MOBILITY FUELS (ADV)	3,981	4,331	1,902	1,963	Cont.	Cont.
	TOTAL	6,470	7,587	4,714	4,979	Cont.	Cont.

B. (U) DESCRIPTION: This program supports projects to evaluate, adapt, and develop energy related technologies for ship, aircraft, and land-based operations to: (a) increase fuel-related weapon systems capabilities such as range and time on station; (b) conserve energy and reduce energy costs; (c) develop a capability to use a wider variety of ship and aircraft fuels without affecting equipment performance or reliability; and (d) reduce Navy shore facilities dependence on petroleum fuels. Through 1985, the Navy Energy R&D Program, of which this program element is a part, had produced energy cost avoidance estimated at $127M per year (compared to 1975 consumption rates). As currently funded, savings of $150M per year by 1995 and $320M per year by 2000 are projected compared to 1985 costs.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603724N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: NAVY ENERGY PROGRAM (ADV)
PROJECT NUMBER: R0829 **PROJECT TITLE:** Energy Conservation (Advanced)

C. (U) DESCRIPTION: This project improves the energy efficiency of Navy ships, aircraft, and shore facilities and thereby contributes to improved fleet sustainability and performance. Major efforts include work to increase the efficiency of aircraft engines and auxiliary systems, develop improved hull coatings and auxiliary equipment for ships, and evaluate alternate energy sources for use at Navy shore facilities.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Completed environmental fate and effect studies of organotin antifouling paint. Demonstrated that slimicides must be included in future antifouling paints. Completed model testing of contra-rotating podded propulsors in support of Integrated Electric Drive. Developed improved compressor/turbine components for F404 engines. Initiated brush seal technology demo in GE-27 test engine. Assessed geothermal capabilities at NWC, China Lake for demonstration of geothermal base heating and cogeneration of power.

2. (U) FY 1991 Program: Develop reliable ablation rate paint matrix for testing of nontoxic antifoulant agents (now in 6.1/6.2). Develop methods to maintain or improve air conditioning efficiency when nonfreon refrigerants must be used. Adapt Closed Loop Environmental Control System (CLECS) technology to fighter/attack aircraft. Complete GE-27 brush seal demo. Transition F404 technology to NAVAIR for demo via Joint Technology Demonstration Engine (JTDE) program. Initiate technology demo to provide pierside 'clean steam' to ships.

3. (U) FY 1992 Plans: Continue ablative paint matrix and nonfreon air conditioning programs. T&E slimicide candidates for antifouling paints. Continue CLECS dev for fighter/attack aircraft. Identify aircraft engine efficiency improvement opportunities resulting from JTDE and other demonstrator programs. Be-gin pierside and facility electric power metering and demand control analyses.

4. (U) FY 1993 Plans: Continue paint and nonfreon air conditioning programs. Monitor Integrated Electric Drive program to identify energy conservation opportunities in the areas of power distribution/control systems/lighting selection/auxiliary equipment. Develop CLECS for fighter/attack. Continue propulsion efficiency improvement programs (e.g., for P-3H and F-14). Develop pierside and facility electric power metering and demand control systems.

5. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: DTRC, Annapolis, MD; NADC, Warminster, PA; NAPC, Trenton, NJ; NCEL, Port Hueneme, CA; NWC, China Lake, CA; NOSC, San Diego, CA. CONTRACTORS: General Electric Corp., Evandale, OH; Teledyne Inet, Torrance, CA; General Electric Corp, Lynn, MA.

F. (U) RELATED ACTIVITIES: PE 0604710N, Navy Energy Program (Eng).
G. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.
H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: N/A

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603724N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: NAVY ENERGY PROGRAM (ADV)
PROJECT NUMBER: R0838 **PROJECT TITLE:** Mobility Fuels (Advanced)

C. (U) **DESCRIPTION:** This project is designed to reduce the impact on Navy operations of degraded fuel quality, supply interruptions, and rapid changes in fuel cost. Recent trends in fuel quality have affected ship and aircraft performance and reliability and resulted in degradation of fuel while in storage. This project is developing: (1) a capability to operate on a wider variety of fuels (i.e., fuels with less tightly controlled properties and/or commercial grade fuels), without compromising system performance and reliability; and (2) revised military fuel specifications which will ensure the procurement of good quality fuels independent of the crude source or refinery process. (Savings of $20M per year by 1992 and $120M per year by 1996 are projected compared to current fuel costs.)

D. (U) **PROGRAM ACCOMPLISHMENTS AND PLANS:**

1. (U) FY 1990 Accomplishments:

a. (U) Obtained American Society of Testing and Materials (ASTM) approval for an improved method to predict the long-term storage stability of shipboard propulsion fuel. b. Developed guidelines for the use of JP-5 that fails to meet the thermal stability specification due to deterioration during storage and/or transportation. c. Finalized F402 (AV8B) emergency fuel utilization guidelines.

2. (U) FY 1991 Program:

a. (U) Complete GE LM2500 combustor rig evaluation to establish vanadium (corrosion) specification limits; continue high speed diesel engine durability evaluations; and complete performance evaluations for the Allison 501K34 engine with broadened specification diesel fuels. b. Determine optimum JP-5 freeze point specification based on current aircraft missions and equipment tolerances.

3. (U) FY 1992 Plans:

a. (U) Initiate performance evaluations for the LM2500 gas turbine engine with broadened specification diesel fuels. b. Develop enhanced accelerated storage stability test to optimize the JP-5 storage stability specification.

4. (U) FY 1993 Plans:

a. (U) Complete high speed diesel engine evaluations and initiate the Allison 501K34 1000-hr durability evaluation with broadened specification fuels.

5. (U) Program to Completion: This is a continuing program.

E. (U) **WORK PERFORMED BY:** IN-HOUSE: DTA , Annapolis, MD; NAPC, Trenton, NJ; NRL, Washington, DC. CONTRACTORS: Allison Gas Turbine, Indianapolis, IN; General Electric Corp., Lynn, MA; Pratt and Whitney, West Palm Beach, FL; Southwest Research Institute, San Antonio, TX; National Institute for Petroleum and Energy Research, Bartlesville, OK; Boeing Military Airplanes, Seattle, WA; Exxon Research and Development, Linden, NJ; Mechanical Technology Inc., Latham, NY.

F. (U) **RELATED ACTIVITIES:** PE 0602233N, Mission Support Technology. This project is part of a joint service program.
G. (U) **OTHER APPROPRIATION FUNDS:** This is a non-acquisition program.
H. (U) **INTERNATIONAL COOPERATIVE AGREEMENTS:** N/A

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603725N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: FACILITIES IMPROVEMENT

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY1991 ESTIMATE	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Y0995	NAVY FACILITIES SYSTEM	300	1,015	466	1,282	CONT	CONT
Y1606	NAVAL CONST FORCES TECH/TOOLS	700	0	0	0	0	13,913
	TOTAL	1,000	1,015	466	1,282		

B. (U) DESCRIPTION: Complete/terminate developments for components, methods and systems for (a) enhancing the pre-attack survivability of critical fixed facilities; and (b) improving post-attack recovery of cratered pavements. Complete offshore/undersea construction systems. Initiate development of explosion containment structures (e.g.high performance magazines). This encompasses the development of advanced reinforced earth and high strength concrete composities to resist the combined effects of close-in blast, fragmentation and heat. Analytical and experimental testing of components and whole structures will validate and demonstrate constructible and affordable systems promising 8-fold superior performance over current technology.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 063725N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: FACILITIES IMPROVEMENT
PROJECT NUMBER: Y0995 PROJECT TITLE: NAVY FACILITIES SYSTEM

C. (U) DESCRIPTION: Project provides new facility concepts and products and technology to support new threats and fleet systems (weapons/munitions systems, etc.).

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:

a. Continued testing of Modular Platform and development of Diver Navigation System for repair of offshore facilities.

b. Completed analytical assessment of initial Camouflage Concealment & Detection (CCD) Effectiveness concepts for fixed facilities.

c. Continued rapid resurfacing system evaluation for crated runways and roads.

2. (U) FY 1991 PROGRAM: Complete preliminary base vulnerability models and CCD test data reduction. Complete Modular Platform testing and Diver Navigation System development. Complete cratered runway/roadway rapid resurfacing system evaluation.

3. (U) FY 1992 PLANS: Develop concepts methods and materials for operationally efficient and structurally safe explosion containment structures, magazines, etc.). Design survivavability concepts to be test demonstrated. Complete offshore survivability/restoration developments.

4. (U) FY 1993 PLANS: Study/test constructability method, traffic flow, and affordability trade-offs for advanced explosion containment structure configurations.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: Naval Civil Engineering Laboratory, Port Hueneme, CA CONTRACTORS: Eastport International, Ventura, CA; Garjak Research Inc., San Diego, CA; Ammann & Whitney, New York, NY; CEMCOM Research Associates, Lanham, MD; Mission Research Corp., Santa Barbara, CA; Southwest Research Institute, San Antonio, TX

F. (U) RELATED ACTIVITIES:
- o Program Element 0602233N, Mission Support Technology
- o Program Element 0602234N, Systems Support Technology

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable

FY 1992/93 RDT&E NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603726N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Merchant Ship Naval Augmentation Program
PROGRAM NUMBER: S0378 PROJECT TITLE: Merchant Ship Naval Auxiliary Program (MSNAP)

A. (U) RESOURCES (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0378	MSNAP	0	0	1,886	1,958	CONT.	CONT.

B. (U) DESCRIPTION: The program requirement is to enable civilian manned merchant ships to perform tasks in support of the Strategic Sealift Mission. This program develops prototype systems from service approved and commercially available components. The mission areas include port-to-port lift, over-the-shore cargo offload and Underway Replenishment. The elements of the program are to provide new militarily useful capabilities, improve ship performance envelopes and increase crew efficiency through mechanization. These elements are necessary because merchant ships were designed to fill a narrow commercial need with the greatest feasible economy. Their crew sizes are small, machinery installations austere and cargo handling facilities oriented toward offload in a developed port. From FY 1982-86, this R&D program produced the Auxiliary Crane Ship (T-ACS), Seashed Systems, Modular Cargo (MCDS) and Fuel (MFDS) Delivery Systems, VERTREP deck, Container Ship Strikeup System, Portable Berthing, Head and Shower Modules, Lighter On Deck Stowage Facility and several other Sealift Enhancement Features. Most RRF ships have been affected by the program. (New Start FY 1992)

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS: Not Applicable.
2. (U) FY 1991 PROGRAM: Not Applicable.
3. (U) FY 1992 PLANS: (New Start)

Design fire detection/suppression system for container ships. Design low-cost vertical cargo lifter. Complete container ship crane enhancement system design. Do detail design and fabricate omni-directional handler.

4. (U) FY 1993 PLANS:

Demonstrate container ship fire detection/suppression system. Complete detail design and fabricate vertical cargo lifter. Fabricate container ship crane enhancement system. Demonstrate omni-directional handler, complete modular 'tween deck design and begin design of integrated container ship Underway Replenishment (UNREP) system.

5. (U) PROGRAM TO COMPLETION:

Demonstrate vertical cargo lifter, container ship crane & integrated UNREP sys. Fabricate 'tween deck. Complete final design of integrated UNREP system, demonstrate modular 'tween deck and develop portable safety lighting system for below. Projected program completion FY 1997.

D. (U) WORK PERFORMED BY: IN-HOUSE: Naval Coastal Systems Center, Panama City, FL; Navy Weapons Handling Center, Colt's Neck, NJ; Naval Ship Weapons Systems Engineering Center, Port Hueneme, CA; Naval Ship Weapons Center, White Oak, MD. Contractors: TBD.

E. (U) RELATED ACTIVITIES: Sealift Support Equipment (PE 0208036N); Sealift Enhancement Modifications (PE 0408036N).

F. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands):

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
OPN LI0958	0	0	0	0	110,000	110,000
OPN LI0958/O&MN*	0	0	0	0	50,000	50,000

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

*Transferring installation support funding from O&MN to OPN in the outyears.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603732M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Advanced Manpower/Training Systems (Advanced)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY1991 ESTIMATE	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C0073	Human Resources Management						
	TOTAL	3,909	3,097	3,294	3,804	CONT.	CONT.

B. (U) DESCRIPTION: This program funds the advanced development of systems and equipment to improve the manpower readiness of the Fleet Marine Force and develops techniques and methods that advance the use and control of human resources in the Marine Corps.

C. (U) DESCRIPTION: This program funds the advanced development of systems and equipment to improve the manpower readiness of the Fleet Marine Force and develops techniques and methods that advance the use and control of human resources in the Marine Corps.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Completed the Officer Planning and Utility System and the Woman Marine Model.

2. (U) FY 1991 Program: Continue systems development. Complete test development for the electronics repair composite of Armed Services Vocational Aptitude Battery (ASVAB).

3. (U) FY 1992 Plans: Continue systems development. Conduct test development for electronics repair composite at Fleet Marine Force Commands and complete Manpower Management Records Branch digital imaging prototype.

4. (U) FY 1993 Plans: Continue systems development. Conduct test development for the Clerical/Administrative composite of ASVAB.

5. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: Naval Personnel Research and Development Center, San Diego, CA and the Naval Postgraduate School, Monterey, CA. CONTRACTORS: Sciences Corporation, Falls Church, VA and Dynamic Concepts, Inc., Washington, DC.

F. (U) RELATED ACTIVITIES: This program relates to all armed services' human resources management and forecasting. efforts.

G. (U) OTHER APPROPRIATION FUNDS: NONE.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603733N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: SIMULATION AND TRAINING DEVICE TECHNOLOGY
PROJECT NUMBER: W1773 PROJECT TITLE: SIMULATION AND TRAINING DEVICES

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W1773	SIMULATION AND TRAINING DEVICES	1,711	5,005	5,177	5,206	CONT	CONT

B. (U) DESCRIPTION: Conducts proof-of-concept demonstration, risk reduction developments, and cost effectiveness investigation of simulator and training technology. Links exploratory development efforts and engineering prototypes. Applies advanced technology to provide improved hands-on training in Antisubmarine (ASW), Antisurface (ASUW), Antiair (AAW), Strike (STW), and Electronic (EW) Warfare for all Navy platforms.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Three projects (Photo Databased Projection, Hands-On-Throttle-And-Stick (HOTAS), and Carrier-Based Weapons System Trainer (CV-WST) supported development of carrier-based mission rehearsal trainer technology. Demonstrated improved helmet displays and advanced-threat prototypes in reconfigurable F/A-18 simulator.

2. (U) FY 1991 Program: Demonstrate interface of three CV-WST project, and develop expert systems to support air warfare decision making. Re-start work on low-cost submarine team trainer, and complete ASW simulation architecture software development. Start flight-crew coordination safety training and under-ice submarine piloting trainer. Design and field test performance measurement criteria for battle force command, control, and communication (C3) team training.

3. (U) FY 1992 Plans: (U) Evaluate effectiveness of three CV WST simulator components for F/A-18 strike missions, and test air warfare threat expert system. Test and demonstrate low-cost submarine team trainer. Continue development of flight crew coordination training and under-ice piloting trainer. Begin experiment using battle force hardware and performance measurement criteria on surface to air tactical scenarios for embedded training.

4. (U) FY 1993 Plans: Evaluate simulator-based mission rehearsal capability of CV-WST simulator architecture. Conduct operational test of under-ice piloting trainer and low-cost submarine team trainer. Deliver flight crew coordination training package and start surface battle station crew coordination training.

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NTSC, Orlando, FL CONTRACTORS: TRACOR Flight Systems, Inc., Santa Monica, CA

E. (U) RELATED ACTIVITIES: PE 0603216A Synthetic Flight Simulator Development; PE 0603227F, Personnel, Training and Simulation Technology; and PE 0603701N, Human Factors Engineering.

F. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.
G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: N/A

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603747N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Advanced ASW Technology

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X1933	ASW Advanced Technology Demonstration	19,847	5,273	14,981	15,395	CONT.	CONT.
W2089	Advanced Collection Technology	17,350	11,000	10,923	11,085	CONT.	CONT.
X1959	At Sea ASW Critical Exper -in P.E. 0603792N-			13,024	14,339	43,907	71,270
X2100	Advanced Deployable Array	0	0	4,011	3,940	3,916	23,429
TOTAL		37,197	16,273	42,939	44,759	CONT.	CONT.

B. ( ) DESCRIPTION: The Advanced Anti-Submarine Warfare (ASW) Technology Program proves underwater acoustic concepts through at-sea and Arctic field experiments and develops Advanced Collection Technologies (ACT) to support a cross-platform direct measurement program

This program is also comprised of advanced sources and active acoustic Critical Sea Tests for ASW Command, Control, Communications and Intelligence (C3I), ASW Advanced Technology, and advanced tactically deployable arrays. The program provides specifications for engineering developments to field ASW passive and active systems capable of detecting the very quiet nuclear and Air Independent Propulsion (AIP) submarine threats and to demonstrate the exploitation of the Arctic environment for ASW operations.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603747N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Advanced ASW Technology
PROJECT NUMBER: X1933 PROJECT TITLE: ASW Advanced Technology Demonstration

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X1933	ASW Advanced Technology Demonstration	19,847	5,273	14,981	15,395	CONT.	CONT.

B. ( ) DESCRIPTION: The Anti-Submarine Warfare (ASW) Advanced Technology Demonstration project (X1933) includes to detect submarine radiated signals which have not been exploited with previous narrowband and broadband ASW processing systems. Current systems are designed to detect acoustic submarine signals which are being significantly reduced in level - this effort is designed to provide detection capability for which either can not be readily reduced in level or occur of the advanced nuclear and diesel submarine. The portion of this project provides for the transition of the SPINNAKER project, developing and deploying sensors and arrays which exploit the

Supporting ASW Command, Control, Communications and Intelligence (C3I) advanced development and threat analyses are included in the project.

C. (U) PROGRAM ACCOMPLISHMENT AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. ( ) Continued task element expanded to include the year 2000 threat in support of Passive Surveillance and Tactical Sensors; commenced field tests.
   b. ( ) Initiated Full Spectrum 6.3A technology demonstration for
   c. ( ) Transitioned competing bender bar technology,
   d. ( ) Supported transition of sonar.
   e. ( ) Modeled and tested at sea ASW Command, Control and Communications (C3) concepts needed to evaluate in coordinated fleet operations.
2. (U) FY 1991 Program:
   a. ( ) Transition task element.
   b. ( ) Commence integrated ASW technology validation.
   c. ( ) Initiate Full Spectrum 6.3A technology demonstration for

PROGRAM ELEMENT: 0603747N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Advanced ASW Technology
PROJECT NUMBER: X1933 PROJECT TITLE: ASW Advanced Technology Demonstration

3. (U) FY 1992 Plans:
a. ( ) Procure demonstration array components, initiate Arctic processor development.
b. ( ) Conduct and interim SPINNAKER field measurements.
c. (U) Analyze and report ICEX 91 sensor performance.
d. ( ) Continue Investigate new LFA source technology for surveillance and tactical applications.
e. ( ) Demonstrate for transition selected signal processing advances and associated C3I development to surveillance and tactical systems. Initiate acoustic warfare implementation planning for cross platform/system interoperability in a operational environment.

4. (U) FY 1993 Plans:
a. ( ) Deploy demonstration array, including advanced processing from Exploratory Development (6.2) programs and FY 1992 results.
b. ( ) Conduct
c. (U) Conduct evaluation of SPINNAKER options and define transition evolution.
d. ( ) Demonstrate improvements.
e. ( ) Continue transition of
f. ( ) Complete/deliver Acoustic Warfare Plan including interoperability and C3I/threat integration.
g. ( ) Initiate display and localization processing improvements mid fiscal year.

5. (U) Program to Completion:
This is a continuing program.

PROGRAM ELEMENT: 0603747N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Advanced ASW Technology
PROJECT NUMBER: X1933 PROJECT TITLE: ASW Advanced Technology Demonstration

D. (U) WORK PERFORMED BY: In-House: NOSC, San Diego, CA; NADC, Warminster, PA; NRL, Washington, D.C.; NSWC, White Oak, MD; NUSC, New London, CT; NAVAIRSYSCOM,WASH; Contractors: Hughes Aircraft Co., Fullerton, CA; AT&T (Bell Labs), Whippany, N.J.; Planning Systems Inc., McLean, VA; GP Taurio, Jacksonville, FL; TRW, McLean, VA.

E. (U) COMPARISON WITH REVISED FY 1991 PRESIDENT'S BUDGET:
(U) $11M for Advanced Collection Technology effort shifted to its own project number (W2089) and project title (Advanced Collection Technology) within this program element.

1. (U) Technical Changes: None
2. (U) Schedule Changes: None
3. (U) Cost Changes: None

F. (U) PROGRAM DOCUMENTATION:

NAPDD #053-98	7 Apr 1987
NAPDD (draft)	May 1990
ASN (RE&S) Memo "Reprogramming and Program Element Project Assignment"	4 Jan 1990
Navy POM 92	Apr 1990

G. (U) RELATED ACTIVITIES: PE 0603708N (Anti-Submarine Warfare Signal Processing); PE 0204311N (Undersea Surveillance Systems); PE 0204313N (Surveillance Towed Array Sensor System); PE 0603792 (Advanced Technology Transition); PE 0604261N (Air ASW); PE0603553N (Surface ASW) and PE 0602314 (ASW Technology).

H. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

I. ( ) INTERNATIONAL COOPERATION AGREEMENTS: MOA.

J. (U) MILESTONE SCHEDULE: See plans and accomplishments.

PROGRAM ELEMENT: 0603747N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Advanced ASW Technology
PROJECT NUMBER: W2089 PROJECT TITLE: Advanced Collection Technology

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W2089	Advanced Collection Technology	17,350	11,000	10,923	11,085	CONT.	CONT.

B. ( ) DESCRIPTION: This program provides the capability to obtain data at being exploited by ASW systems currently being developed. Programs such as region. There is currently of actual . One effort of this program is the development of a family of which will operate and cover U.S. Navy Another effort is the development of which, by being extremely

These sonobuoys, along with will also be used to . Special will be built which will be able to determine the The ability to will be provided by the development of operating in the region. In addition, these will be evaluated for their ability to

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

a. ( ) Initiated Advanced Collection Technology (ACT) effort to develop a capability for An acquisition plan has been approved and contracts have been signed to develop a new sonobuoys to replace the sonobuoy that will also cover the In addition, a and a "A" size AMP will be developed to provide to be utilized by new designs.

b. ( ) Developed a Conducted at sea measurements; and initiated performance prediction capability and support database.

PROGRAM ELEMENT: 0603747N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Advanced ASW Technology
PROJECT NUMBER: W2089 PROJECT TITLE: Advanced Collection Technology

c. ( ) Contracts signed for development of an incorporating a sonobuoy suspension and incorporating a to a conventional data link to collect

d. ( ) Initiated development effort of the Sonobuoy Thinned Array Program (STRAP). STRAP is an ASW system using The buoys are to provide estimates, thus increasing the Contracts were signed for hardware, and technical support and algorithm development.

e. ( ) Contracted upgrade of including a new high-speed modular signal processor.

f. ( ) Procured

2. (U) FY 1991 Program:

a. ( ) Continue development of new ACT capability. Continue development and test of the "A" size family of to include the units.

b. ( ) Continue hardware and efforts on the STRAP program.

c. ( ) Continue support of the performance prediction and measurement capability, including additional at sea measurements.

3. (U) FY 1992 Plans:

a. ( ) Continue development of new ACT capability. Continue development and test of the "A" size family of

b. ( ) Continue support of the performance prediction and measurement capability, including additional at sea measurements.

4. (U) FY 1993 Plans:

a. ( ) Continue development of new ACT capability. Complete testing of the "A" size family of to include the Complete integration into aircraft. Receive delivery of units for operational evaluation.

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NADC, Warminster, PA; NATC, Patuxent River, MD; NSWC, White Oak, MD; NWSC, Crane, IN; NAC, Indianapolis, IN; and NOSC, San Diego, CA. CONTRACTORS: Sparton Electronics Div., Jackson, MI.

PROGRAM ELEMENT: 0603747N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Advanced ASW Technology
PROJECT NUMBER: W2089 PROJECT TITLE: Advanced Collection Technology

E. (U) COMPARISON WITH REVISED FY 1990/1991 PRESIDENT'S BUDGET:
1. (U) Technical changes: None
2. (U) Schedule changes: None
3. (U) Cost changes: None

F. (U) PROGRAM DOCUMENTATION:
NDCP W0-49-AS 6/20/80
NAPDD 076-095 4/15/86
NAPDD (rev draft) 2/90

G. (U) RELATED ACTIVITIES: PEs 0603529N (Advanced ASW Target); 0603553N (Surface ASW); 0604713N (Surface ASW Systems Improvement); 0603691N (MK 48 Advanced Capabilities); 0603610N (Advanced Lightweight Torpedo); 0603254N (Air ASW Adv Sensors); 0604261N (Acoustic Search Sensors); 0604221N (P-3C Mod Program); 0604212N (LAMPS); 0604229N (Carrier Inner zone ASW Helo); 0603792N (Advanced Technology Transition).

H. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

PROGRAM ELEMENT: 0603747N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Advanced ASW Technology
PROJECT NUMBER: X1959 PROJECT TITLE: Critical Sea Tests, Phase II

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X1959	Critical Sea Tests, Phase II	24,383 *	11,993 *	13,024	14,339	43,907	71,270

* in PE 0603792N

B. ( ) DESCRIPTION: The Critical Sea Tests project (X1959) Phase II transferred from PE 0603792N in FY 92 with objectives broadened to address all issues. The project addresses both scientific and interoperability issues. Reverberation, transmitted waveforms, processing algorithms and operational considerations are evaluated in key at-sea areas of ASW interest, to provide design information for planned and potential low frequency active systems.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Not applicable.

2. (U) FY 1991 Program: Not applicable.

3. (U) FY 1992 Plans:
   a. (U) Conduct combined air/submarine/surface/surveillance ASW sea tests.
   b. ( ) Conduct fixed receiver tests

4. (U) FY 1993 Plans:
   a. ( ) Conduct combined tactical and surveillance (fixed receivers) sea tests
   b. ( ) Conduct surface and submarine tactical sea tests
   c. (U) Analyze and report results of FY 1992 tests.

5. (U) Program to Completion:
   a. (U) Conduct two tests per year in FY 1994 and 1995.
   b. (U) Conduct one sea test in FY 1996.
   c. (U) Complete analysis of all sea tests.
   d. (U) Demobilize sea test assets by mid FY 1997.

PROGRAM ELEMENT: 0603747N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Advanced ASW Technology
PROJECT NUMBER: X1959 PROJECT TITLE: Critical Sea Tests, Phase II

D. (U) WORK PERFORMED BY: In-House: NRL, Washington, D.C.; NOARL, Bay St. Louis, LA; NOSC, San Diego, CA; NECL, Pt. Hueneme, CA; NADC, Warminster, PA; and NUSC, New London, CT. Contractor: The John Hopkins University/Applied Research Laboratory, Laurel, MD.

E. (U) COMPARISON WITH REVISED FY 1991 PRESIDENT'S BUDGET:

1. (U) Technical Changes: None.
2. (U) Schedule Changes: None.
3. (U) Cost Changes: None.

F. (U)PROGRAM DOCUMENTATION: Navy POM 92 April 1990.
NAPDD October 1986
NAPDD (rev draft) May 1990

G. ( ) RELATED ACTIVITIES: PE 0603785N (ASW Environmental Acoustic Support (AEAS)) provides at-sea measurements and data collection; PE 0204311N (Integrated Undersea Surveillance System (IUSS) Development) provides development, testing and deployment of an capability. All tactical ASW acoustic sensor programs.

H. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: N/A

J. (U) MILESTONE SCHEDULE:

Plan and Execute Phase II Sea Tests	1/4 Qtrs FY92
Complete Data Analysis	1 Qtr FY93
Plan and Execute Sea Tests	2/4 Qtrs FY93
Complete Data Analysis	1 Qtr FY94

PROGRAM ELEMENT: 0603747N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Advanced ASW Technology
PROJECT NUMBER: X2100 PROJECT TITLE: Advanced Deployable Array

C. ( ) DESCRIPTION: The Advanced Deployment Array Concept would provide an undersea detection capability using sensors against high noise areas. These areas include regions of Low Intensity Conflict (LIC), or areas requiring an' It could provide to ASW tactical forces in those areas where and those areas requiring capability. The Advanced Deployable Array includes' and a processing system capable of operating in both a barrier and field configuration. The array would also be developed to act as a receiver for systems. The array will utilize fiber optic undersea communication technology and for high data rate and long transmission with light-weight cable lengths. The array will be developed in a modular design configuration to evaluate depending on mission requirements facilitating The program will also be used to complement the drifting sensor Advanced Collection Technology portion of this Program Element, for

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: N/A.
2. (U) FY 1991 Program: N/A
3. (U) FY 1992 Plans:

(U) Award development contracts, perform studies to define missions, sites and performance requirements; perform studies to determine potential sensor configuration to meet mission and site requirements; perform deployment system design and test; and fabricate a sensor array test bed.

4. (U) FY 1993 Plans:

(U) Deploy test bed in appropriate shallow water high noise area; operate test bed against specified control targets; analyze data to determine threat vulnerabilities and sensor performance; define operational system structures based on test bed data.

5. (U) Program to completion: This is a continuing program

(U) Fabricate an advanced deployment system, test in real world site; continue analysis performance of various platform delivery options.

E. (U) WORK PERFORMED BY: In-House: NOSC, San Diego, CA, Contractors selected on a competitive basis.

F. (U) RELATED ACTIVITIES:
PE 0603708N (ASW signal Processing); PE0604784N (Fixed Distributed System); PE 0101224N (Port Area Surveillance System).

G. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603763N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Warfare System Architecture and Engineering
PROJECT NUMBER: X1991 PROJECT TITLE: WSA&E

A. (U) **RESOURCES:** (Dollars in Thousands)

Project Number	Title	FY 1990 Actual	FY 1991 Estimate	FY 1992 Estimate	FY 1993 Estimate	To Complete	Total Program
X1991	WSA&E	6682	6826	7365	8061	Cont.	Cont.

B. (U) **DESCRIPTION:** Using a comprehensive analytical process, WSA&E assesses warfighting value of programs for Navy functions (Sea Control, Power Projection); forces (Carrier Battle Force (CVBF)); Warfare Missions (AAW, ASW, ASUW, etc.); and Support Missions (C3, EW, Space, etc.). It assesses capability and achievability against future top-level requirements and proposes systems engineered warfighting system options. Program coordinates SYSCOM/PEO efforts for system/platform interoperability and focuses R&D Center activities on common objectives.

C. (U) **PROGRAM ACCOMPLISHMENTS AND PLANS:**

1. (U) FY 1990 ACCOMPLISHMENTS:
   a. (U) Continued development of WSA&E performance data base.
   b. (U) Continued to support the Navy's Master Planning teams.
   c. (U) Maintained the Force System Engineering Plan (FSEP).
   d. (U) Defined Sea Control (SC) current architecture for Warfare Mission Areas (WMAs)/Warfare Mission Support Areas (WMSAs).
   e. (U) Developed architectural assessments for SC.
   f. (U) Developed recommendations to resolve C3I issues.
   g. (U) Conducted studies to support WMA Appraisals.
2. (U) FY 1991 PROGRAM:
   a. (U) Complete SC assessment from FY 90 (Contingency And Limited Objectives Warfare (CALOW) #1 scenario).
   b. (U) Develop SC assessment for CALOW #2 scenario.
   c. (U) Develop/assess options for SC (CALOW #1/#2 scenarios).
   d. (U) Determine fiscally constrained option for SC (CALOW #1/#2).
   e. (U) Define Power Projection (PPJ) current architecture.
   f. (U) Initiate development of integrated assessment environment.
3. (U) FY 1992 PLANS:
   a. (U) Develop architecture assessment for PPJ (CALOW #1/#2).
   b. (U) Develop and assess option for PPJ (CALOW #1/#2 scenarios).
   c. (U) Determine fiscally constrained option for PPJ (CALOW #1/#2).
   d. (U) Initiate architecture assessment for PPJ Regional.
   e. (U) Continue integrated assessment environment.
4. (U) FY 1993 PLANS:
   a. (U) Complete architecture assessment for PPJ Regional.
   b. (U) Develop architecture assessment for PPJ (Global).
   c. (U) Develop and assess option for PPJ (Regional and Global).
   d. (U) Determine fiscally constrained option for PPJ.
   e. (U) Complete integrated assessment environment.
   f. (U) Revise SC current architecture to reflect SYDP.
   g. (U) Develop architecture assessment for SC (Regional scenario).
   h. (U) Develop and assess option for SC (Regional Scenario).
5. (U) PROGRAM TO COMPLETION: This continuing program is an integral part of Navy Force planning. First cycle will be completed in FY 93.

D. (U) **WORK PERFORMED BY:** IN-HOUSE: DTRC, Bethesda, MD; NAVOCEANSYSCEN, San Diego, CA; NAVSWC, Dahlgren, VA; NAVAIRDEVCEN, Warminster, PA; NAVWPNCEN, China Lake, CA; NAVCOASTSYSCEN, Panama City, FL; NAVUNDERSEASYSCEN, Newport, RI. CONTRACTORS: Vitro, Silver Spring, MD; Booz-Allen, Hamilton, Bethesda, MD; APL/JHU, Laurel, MD; TRIDENT, Fairfax, VA; MITRE, Reston, VA; SAIC, Lajolla, CA.

E. (U) **RELATED ACTIVITIES:** None.

F. (U) **OTHER APPROPRIATION FUNDS:** This is a non-acquisition program.

G. (U) **INTERNATIONAL COOPERATIVE AGREEMENTS:** None.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603785N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: ASW Environmental Acoustic Support (AEAS)

A. (U) **RESOURCES:** (Dollars in thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0120	AEAS Ocean Measurement and Modeling Project	17,411	14,845	15,213	15,059	CONT.	CONT.
R2017	Advanced Underwater Acoustic Modeling Project	10,689	2,492	3,159	3,197	CONT.	CONT.
TOTAL		28,100	17,337	18,372	18,256	CONT.	CONT.

B. (U) **DESCRIPTION:** The ASW Environmental Acoustic Support (AEAS) Program provides ocean environmental acoustic R&D to assess, enhance and predict the performance of current and proposed ASW surveillance, tactical and weapon systems. This effort is accomplished through at-sea experimentation, numerical model and database development, fleet technical support and instrumentation development. AEAS Research and Development supports all scales of Naval operations, including global, theater, regional, and local. The program is especially applicable to CALOW/LIC operations.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603785N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: ASW Environmental Acoustic Support (AEAS)
PROJECT NUMBER: R0120 PROJECT TITLE: AEAS Ocean Measurement and Modeling Proj

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0120	AEAS Ocean Measurement and Modeling Project	17,411	14,845	15,213	15,059	CONT.	CONT.

B. ( ) DESCRIPTION: The quieting of new generation threat submarines has

To counter this threat, there is an urgent and continuing need to exploit the opportunities to enhance system performance through a better understanding of the ocean environment. This project provides environmental acoustic predictive capability and data essential to optimize the design, development and performance of under-sea acoustic surveillance and tactical ASW systems, thus extending detection ranges, increasing time to possible enemy counter-detection and enhancing ASW platform survivability. It conducts undersea environmental and acoustic measurements and develops computer prediction products, measurement instrumentation, databases and analyses in support of ASW systems.

C. ( ) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. ( ) FY 1990 ACCOMPLISHMENTS:

a. ( ) Participated in a large, carefully controlled experiment to acquire data used to determine and explain the effect of the oceanic environment (in particular, high wind speeds and high sea states) on the performance of

b. (, Expanded comprehensive ocean measurement and numerical modeling program critical for the development and deployment of
Completed Quicklook study for

c. (U) Conducted a demonstration test of a prototype operational acoustic tomography system to evaluate its utility for real-time monitoring of mesoscale ocean features affecting ASW performance.

d. (U) Delivered a passive shallow water range dependent model for Fleet use.

e. ( ) Completed publication of AEAS

f. ( ) Delivered improved towed array sonar system performance prediction and optimization systems to Fleet (OPTAMAS).

g. (, Delivered for patrol aircraft deployments, and expanded

h. ( ) Developed improved databases and models for inclusion in SPARS. Initiated development of a performance prediction capability in the System for the Prediction of the Acoustic Response Sensors (SPARS).

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603785N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: ASW Environmental Acoustic Support (AEAS)
PROJECT NUMBER: R0120 PROJECT TITLE: AEAS Ocean Measurement and Modeling Proj

i. ( ) Published results from FY 1988-89 shallow water Arctic exercises, and expanded

j. (U) Completed development and deployment of second unit of advanced digital ocean acoustic measurement and recording system (ADABS).

k. (U) Completed and published report on new survey measurement instrumentation requirements for support to emerging acoustic ASW systems.

2. ( ) FY 1991 PROGRAM:

a. ( ) Analyze results from FY 1990 open ocean experiments to influence

b. ( ) Conduct ocean experiment in high interest area in support of low frequency active sonar development.

c. (U) Prepare pre-assessments of ocean areas to determine performance of emerging ASW systems.

d. ( ) Deliver a

e. ( ) Initiate efforts to extend Low Frequency Active (LFA) reverberation model Collect low frequency propagation data in support of these modelling efforts.

f. ( ) Complete publication of FY 1988-89 shallow water Arctic exercise products and tactical decision aids, and expand support of

g. ( ) Conduct joint marginal ice zone experiment

h. (U) Conduct first in series of major shallow water ASW experiments.

i. (U) Develop survey and databasing technique for volume reverberation studies.

j. ( ) Participate in bottom distributed system (ADI) field experiment

k. (U) Initiate ocean simulation capability for expanded acoustic/oceanographic programs.

3. ( ) FY 1992 PLANS:

a. (U) Provide environmental data to systems designers for incorporation into emerging ASW systems design concepts.

b. (U) Perform pre-assessments of ocean areas to evaluate ASW system performance characteristics.

c. ( ) Increase data collection efforts at lower frequencies.

d. ( ) Continue to participate in major field experiments in support of ASW system design and operations by providing data collection, analysis and modeling expertise.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603785N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: ASW Environmental Acoustic Support (AEAS)
PROJECT NUMBER: R0120 PROJECT TITLE: AEAS Ocean Measurement and Modeling Proj

e. (U) Continue development and enhance sophistication of ocean simulation capability.
f. (U) Complete analysis of FY-88/89 Arctic data.
g. (U) Validate shallow water propagation model for LFA systems.

4. ( ) FY 1993 PLANS:
a. (U) Continue to develop field measurement techniques which will support database requirements for ASW systems.
b. (U) Support advanced systems concepts by conducting ocean area assessments via modeling and designing of initial survey requirements.
c. ( )
d. ( )
e. (U) Participate in field experiments in support of emerging ASW systems design and operations.
f. (U) Continue development of environmental models and databases to enhance shallow-water operational capabilities.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NOARL, Stennis Space Ctr, MS; NRL, Washington, DC; NUSC, New London, CT. CONTRACTORS: Applied Research Laboratories, University of Texas, Austin, TX; Planning Systems Inc., McLean, VA and Slidell, LA; Science Applications International Corp., McLean, VA; Systems Integrated, San Diego, CA.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
1. (U) TECHNOLOGY CHANGES: Not Applicable
2. (U) SCHEDULE CHANGES: Not Applicable
3. (U) COST CHANGES: Not Applicable

F. (U) PROGRAM DOCUMENTATION: NAPDD #018-006, 17 January 1986.

G. (U) RELATED ACTIVITIES:

- PE 0204311N, Undersea Surveillance Systems
- PE 0603784N, Fixed Distributed System
- PE 0603792N, Advanced Technology Transition

H. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE: Not Applicable.

PROGRAM ELEMENT: 0603785N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: ASW Environmental Acoustic Support (AEAS)
PROJECT NUMBER: R2017 PROJECT TITLE: Adv Underwater Acoustic Modeling Proj

C. (U) DESCRIPTION: This Project is focused on the development of a multi-sensor ASW system performance prediction capability in support of low frequency, active ASW systems currently being planned and developed for use in the 1990's.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:

a. (U) Finalized development of multi-static modeling capability.

b. (U) Provided model and environmental acoustic measurement support to CST Program and tested active model results with Critical Sea Test (CST) data.

c. (U) Tested simulation of effects of ocean fronts on acoustic performance prediction in bi-static geometry.

2. (U) FY 1991 PROGRAM:

a. (U) Upgrade range-dependent bi-static model, including oceanography module for SYSCOM and development users; participate in CST, LFA and AN/SQQ-89I sea tests and evaluate multi-static model against experimental data.

b. (U) Integrate oceanography module and Baseline model with 3-D graphical capability.

c. (U) Develop modeling capability for bottom-mounted systems.

d. (U) Test, evaluate, and deliver MOD I for SYSCOM, laboratory and contractor use on VAX and SUN-4 computers.

3. (U) FY 1992 PLANS:

a. (U) Update/improve multi-static model for IUSS/SQQ-89 (I); participate in LFA technical evaluation; develop fully 3-D Baseline model.

b. (U) Deliver bottom-mounted system model to SYSCOM users for evaluation.

c. (U) Add Sonobuoy module to MOD I.

4. (U) FY 1993 PLANS:

a. (U) Upgrade/improve multi-static model for NAVAIR (sonobuoy) use.

b. (U) Deliver integrated ocean/acoustic multi-static model to Navy for use in conjunction with LFA operational evaluation.

c. (U) Test MOD 2 system with ocean, acoustic and detection data.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NOARL, Stennis Space Ctr, MS; NRL, Washington, DC; NAVOCEANSYSCEN, San Diego, CA. CONTRACTORS: Science Applications International Corp., McLean, VA; Planning Systems Inc., McLean, VA and Slidell, LA; SYNTEK Engineering and Computer Systems, Rockville, MD and Bay St. Louis, MS.

F. (U) RELATED ACTIVITIES: o PE 0603792N, Advanced Technology Transition; o PE 0603747N, Advanced Anti-Submarine Warfare Technology; o PE 0603708N, Anti-Submarine Warfare Signal Processing

G. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.
H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603792N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: ADVANCED TECHNOLOGY TRANSITION

A. ( ) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R1889	Advanced Technology Transition	42,950	48,811	65,153	81,197	CONT.	CONT.
X1959	At Sea ASW Critical Experiments	24,383	11,993	0	0	0	CONT.
	TOTAL	67,333	60,804	65,153	81,197	CONT.	CONT.

B. ( ) DESCRIPTION:

1. (U) The Advanced Technology Transition Program Element addresses a vital issue within the Navy technology base - the transition of maturing technologies which best meet Navy needs. This is often difficult for high risk/high payoff technologies and also for those technologies which tend to have broad systems application. This program is a primary Navy vehicle for implementation of recommendations of the Packard Commission and 1987 Defense Science Board Study. The program provides transition of the Navy's most promising technological opportunities into 6.3B and 6.4 programs through risk-reducing Advanced Technology Demonstrations (ATDs). It provides a linkage between Navy requirements and emerging technologies, promotes transition of the best maturing 6.2 concepts, and reduces systems development risk.

2. ( ) The program element also supports efforts to reduce uncertainty in system performance and design in the early phases of Navy commitment for system developments. Through a series of extensive at-sea experiments, it resolves critical technology issues which validate concepts supported by the ASW Master Plan and apply over all ASW tactical and surveillance platforms. These system concepts are critical to counter the rapid advances demonstrated in today's being procured and produced by Third World countries and for the

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603792N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: ADVANCED TECHNOLOGY TRANSITION
PROJECT NUMBER: R1889 PROJECT TITLE: ADVANCED TECHNOLOGY TRANSITION

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R1889	Advanced Technology Transition	42,950	48,811	65,153	81,197	CONT.	CONT.

B. (U) DESCRIPTION: The Advanced Technology Transition project is designed to transition the best and most needed technologies into development programs through three year risk-reducing Advanced Technology Demonstrations (ATDs) of systems or sub-systems with clear Navy need and very high payoff.

C. ( ) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. ( ) FY 1990 ACCOMPLISHMENTS:
   a. ( ) All Optical Towed Array (AOTA) - array demo.
   b. (U) Unified Network Technology (UNT) - Mixed-media multi-network demo.
   c. ( ) Airborne Transient Processor - demo.
   d. ( ) Fiber Optic Mk 48 ADCAP (FO48) - demo.
   e. (U) Surveillance IRST (SIRST) - Prelim. fleet exercise test.
   f. ( ) Magnetic Acoustic Detection of Mines (MADOM) - Demo at
   g. (U) Quiet Weapon Launch (Quiet Launch) - Electromagnetic launcher fabricated.
   h. (U) Ultra-Low-Noise CFA (ULNCFA) - Finalized design.
   i. ( ) Adaptive Monopulse Countermeasures (Monopulse CM) - tested.
   j. (U) Programmable Automated Welding System (PAWS) - Defined system configuration.
   k. (U) Synthetic Red Blood Cells (Syn Blood) - Animal testing conducted.
   l. (U) Advanced Techniques/Products for Combat Wound Management (Wound Mngmnt) - Prepared antibiotic beads, wound dressing for test.
   m. ( ) Missileborne Integrated Neural Network Demonstration (MINND) -
   n. (U) Undersea Weapons Guidance and Control (Undersea G&C) - Hardware integrated.
   o. ( ) Advanced ESM for Ship Defense (Adv ESM) - Tested architecture.
2. ( ) FY 1991 PROGRAM:
   a. ( ) SIRST - test in fleet exercise.
   b. (U) Quiet Launch - In-water laboratory tests.

PROGRAM ELEMENT: 0603792N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: ADVANCED TECHNOLOGY TRANSITION
PROJECT NUMBER: R1889 PROJECT TITLE: ADVANCED TECHNOLOGY TRANSITION

c. ( ) ULNCFA - Build and test in
d. (U) Monopulse CM - System integration; at-sea tests.
e. (U) PAWS - Enhance complex controller/sensors.
f. (U) Syn Blood - Human hemoglobin production.
g. (U) Wound Mngmnt - Conduct large animal testing.
h. ( ) MINND -
i. (U) Underwater G&C - In-water demonstration.
j. ( ) Adv ESM - tests
k. ( ) Advanced Electronic Decoy (Adv Decoy)
l. (U) Low Cost Planar Arrays (LCPA) - Fabricate prototype components.
m. ( ) SPOTLIGHT - Design
n. (U) Fluidic Flight Controls (Fluiditics) - Design F/A-18 controls.
o. ( ) Quiet Surface Ship Propellers (Quiet Props) - Design propeller blades
p. ( ) Air/Surface ASW Weapon, High Energy Propulsion (High Energy Propul) - Develop engine.

3. ( ) FY 1992 PLANS:
a. (U) PAWS - Conduct final demonstration.
b. (U) Syn Blood - Large animal testing; begin large scale production.
c. (U) Wound Mngmnt - Large animal and human trials.
d. ( ) MINND - Final testing
e. ( ) Underwater G&C - tests
f. ( ) Adv ESM -
g. ( ) Adv Decoy -
h. ( ) LCPA - Test
i. ( ) SPOTLIGHT
j. (U) Fluiditics - Conduct lab tests.
k. (U) Quiet Props - Manufacture blades.
l. ( ) High Energy Propul - In-water testing
m. ( ) Multibeam Transient Detection/Classification (Multibeam T/C) -
n. ( ) Spaceborne SAR Countermeasures (Space SAR CM) -
o. ( ) Multiband Softkill EW (Soft EW) -
p. ( ) Submarine Multiline Towed Array (Sub Towed Array) -
q. (U) Multi-Mission Propulsion Technology (M/M Propul) - Design assessment, integration, and test requirements specified.
r. (U) Air/Surface Data Fusion (A/S Data Fusion) - Demo data transfer/correlation.
s. (U) ATA - Begin situational analysis.
t. (U) High Performance Ammo Storage Magazine (HP Mag) - Component design.

PROGRAM ELEMENT: 0603792N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: ADVANCED TECHNOLOGY TRANSITION
PROJECT NUMBER: R1889 PROJECT TITLE: ADVANCED TECHNOLOGY TRANSITION

4. ( ) FY 1993 PLANS:
   a. ( ) Adv Decoy -
   b. ( ) LCPA -
   c. ( ) SPOTLIGHT - Demo
   d. (U) Fluiditics - Install and conduct F/A-18 flight tests.
   e. (U) Quiet Props - Sea trials of installed propellers.
   f. ( ) High Enery Propul - final tests.
   g. ( ) Multibeam D/C - Preliminary test
   h. ( ) Space SAR CM -
   i. ( ) Soft EW -
   j. ( ) Sub Towed Arrays -
   k. (U) M/M Propul - Motor and vehicle construction.
   l. (U) A/S Data Fusion - Laboratory demonstrations.
   m. (U) ATA - Continue situational awareness.
   n. (U) HP Mag - Full scale manufacture.
   o. (U) Start ATD sub-projects identified in FY 91 selection process.

5. (U) PROGRAM TO COMPLETION: This is a continuing program. New sub-projects start every year, and transition, on average, three years later.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSWC, Dahlgren, VA; DTNSRDRC, Bethesda MD; NAVAIRDEVCEN, Warminster, PA; NAVCOASTSYSCEN, Panama City, FL; NAVOCEANSYSCEN, San Diego, CA; NAVWPNCEN, China Lake, CA; NUSC, New London, CT; NRL, Washington, DC; and various DOD activities. CONTRACTORS: Litton, Westinghouse, Honeywell, Hughes, AT&T, and Sunstrand.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
   1. (U) Technology Changes: Not applicable.
   2. (U) Schedule Changes: Not applicable.
   3. (U) Cost Changes: Not Applicable

F. (U) PROGRAM DOCUMENTATION: Non-acquisition Program Definition Documents in place for all funded Advanced Technology Demonstrations.

G. (U) RELATED ACTIVITIES: Navy and other DOD tech base Program Elements, and industry IR&D are sources of technology opportunities for ATDs.

H. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE:
   FY 91: Transition - AOTA, UNT, Trans Proc, FO48, and MADOM.
   FY 92: Transition - ULNCFA, SIRST, Monopulse CM, and Quiet Launch.
   FY 93: Transition - PAWS, Wound Mngmnt, Syn Blood, MINND, Underwater G&C, and Adv ESM.

PROGRAM ELEMENT: 0603792N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Advanced Technology Transition
PROJECT NUMBER: X1959 PROJECT TITLE: At-Sea ASW Critical Experiments

C. ( ) DESCRIPTION: The Critical Sea Test (CST) Program reduces risk in system designs during the early phases of commitment for system developments. The program, through a series of at-sea experiments, resolves critical technology issues which validate concepts supported by the ASW Master Plan and applies to all ASW tactical and surveillance platforms. These system concepts are critical to counter the advances

The follow-on CST Phase II, which emphasizes concept of operations validation and system interoperability issues resolution, will be funded under PE 0603747N, X1959 beginning in FY-92.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:
1. ( ) FY 1990 ACCOMPLISHMENTS:
   a. (U) Conducted fourth CST test.
   b. (U) Completed data analysis for second and third CST.
   c. ( ) Demonstrated

Demonstrated the potential application in ocean acoustic environments representative of almost 80 percent of the world open oceans. Showed the potential for

2. ( ) FY 1991 PROGRAM: Complete analysis of fourth Critical Sea Test. Conduct the fifth Critical Sea Test

3. (U) FY 1992 PLANS: N/A, Note: Program transitions to PE 0603747N.
4. (U) FY 1993 PLANS: N/A
5. (U) PROGRAM TO COMPLETION: N/A.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, D.C.; NOARL, Bay St. Louis, LA; NAVOCEANSYSCEN, San Diego, CA; NAVCIVENGRLAB, Pt. Hueneme, CA; NAVAIRDEVCEN, Warminster, PA; and NUSC, New London, CT. CONTRACTOR: The Johns Hopkins University/Applied Research Laboratory, Laurel, MD.
F. ( ) RELATED ACTIVITIES: PE 0603785N (ASW Environmental Acoustic Support (AEAS)) provides at-sea measurements and data collection; PE 0603747N (Advanced ASW Technology Demonstration) proves concepts; PE 0204311N (Integrated Undersea Surveillance System (IUSS) Development) develops Surveillance Towed Array Sensor System (SURTASS) capability, PE 0604713N (AN/SQQ-89I) and PE 0603254N (Air ASW sensors).
G. (U) OTHER APPROPRIATION DATA: This is a non-acquisition program.
H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: CST-1 and 2 were conducted with the United Kingdom under IEP-B-85.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603794N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: C3 Advanced Technology
PROJECT NUMBER: X2091 PROJECT TITLE: SEC ADV TECHNOLOGY

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X2091	Space and Electronic Warfare Advanced Technology	0	0	1,373	1,892	Cont.	Cont.

B. (U) DESCRIPTION: This program is a new start. This program researches the next generation communications systems for U.S. Navy ships, aircraft and submarines. Projects will be conducted in three C3 areas: (1) Automated Integrated Communications System (AICS), the application of digital networking techniques to voice, data and video communications, (2) transition of C3 developmental software into ADA and (3) a multi-level secure processing system to provide a common operational picture among tactical units.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS: Not applicable.
2. (U) FY 1991 PROGRAM: Not applicable.
3. (U) FY 1992 PLANS:
   a. (U) Complete detailed design requirements for AICS.
   b. (U) Develop ADA performance predictor and rapid prototyping (RP) tool incorporating automated requirements specification and verification.
   c. (U) Complete detailed MLS requirements specification.
4. (U) FY 1993 PLANS:
   a. (U) Complete system control software in ADA. Provide laboratory end-to-end demonstration of system concept. Commence development of multi-net controller.
   b. (U) Continue development of RP tool. Commence development of automated Test Generator (TG) to examine ADA code constructs.
   c. (U) Prototype candidate architectures. Demonstrate most promising MLS data base candidate.
5. (U) PROGRAM TO COMPLETION: This is a continuing program. Complete AICS multinet controller; demonstrate capability to concurrently communicate with other units via AICS waveforms and standard single channel Demand Assigned Multiple Acess (DAMA) waveforms; complete RP and TG; execute demonstration project; develop Context Sensitive Editor, Completeness Checker, Consistency Checker, Object-Oriented Manipulator, Cost Predictor, Project Monitor and Structured Review Support; and demonstrate an integrated (SI and GENSER sources) tactical display.

D. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, DC; NAVOCEANSYSCEN, San Diego, CA; NAVSWC, Dahlgren, VA.
CONTRACTORS: To be determined.

E. (U) RELATED ACTIVITIES: Program Element 0303401N, Communications Support; Program Element 0602234N, Computer Technology; Program Element 0602232N, Command and Control Technology; Program Element 0604574N, Computer Security; Program Element 0604231N, NCCS Ashore and NCCS Afloat and Program Element 0305167G, Computer Security Program, NSA.

F. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603795N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Gun Weapon System Advanced Technology
PROJECT NUMBER: S2093 PROJECT TITLE: Gun Weapon System Advanced Technology

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 90 ACTUAL	FY 91 EST	FY 92 EST	FY 93 EST	TO COMPL	TOTAL PROG
S2093	Gun Weapon System Advanced Technology (New Start)	0	0	5,134	7,865	CONT	CONT

B. (U) DESCRIPTION: The purpose of the Advanced Gun Weapon System Technology Program will be to investigate and evaluate concepts that will be used to design/develop an Advanced Gun Weapon System (GWS) for requirements beyond the year 2000. Current Gun Weapon Systems designs have moderate or limited effectiveness in response to threats such as the following: a) High speed, maneuvering surface targets. b)Small craft (cheap kill). c) Precision firing in friendly/enemy confined areas. d) Inability to support over-the-horizon amphibious assaults, due to lack of range and guidance. e) Low flying air targets. In addition, technologies which have been developed and funded by other agencies will be evaluated, and where appropriate, will be tailored to provide near-term benefits to surface combatants in Low-Intensity Conflict (LIC) scenarios. By following this approach, maximum return on investment will be realized.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS

1.(U) FY 1990 Accomplishments: Not applicable.

2.(U) FY 1991 Program: Not applicable.

3.(U) FY 1992 Plans:

a.(U) The program will emphasize the investigation of smart munitions with increased range, guidance, and increased payload lethality.

b.(U) The program will investigate a range of GWS technologies to satisfy operation requirements. As a minimum, the program would address the following technologies:

- Advanced propulsion concepts.
- Over-the-horizon target acquisition techniques utilizing the Global Positioning System (GPS).

4.(U) FY 1993 Plans:

a.(U) Commence design/development of an Advanced Gun Weapon System, including gun, fire control and ammunition components/systems.

b.(U) Initiate development of electro-optical fire control system.

5.(U) Program to Completion: Continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVORDSTA Louisville; NSWC Dahlgren; NSWC White Oak; NAVORDSTA Indian Head; NWSC Crane; CONTRACTORS: TBD.

E. (U) RELATED ACTIVITIES: Not applicable.

F. (U) OTHER APPROPRIATION FUNDS: Not applicable.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604203N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Standard Avionics Development

A. (U) RESOURCES: (Dollars in Thousands)

Project Number	Title	FY 1990 Actual	FY 1991 Estimate	FY 1992 Estimate	FY 1993 Estimate	To Complete	Total Program
W0572	JT SRV/NAV STD AVCS	10,387	7,402	11,572	12,133	Cont.	Cont.
W1630	CAINS II	987	85	0	0	15,197	15,197
	TOTAL	11,374	7,487	11,572	12,133	Cont.	Cont.

B. (U) DESCRIPTION: A growing concern in Naval Aviation is the proliferation of unique avionic equipment that increases with each new or modified aircraft. This proliferation of unique Contractor Furnished Equipment (CFE), due to non-availability of off-the-shelf Government Furnished Equipment (GFE), has resulted in a growing cost burden in the areas of development, procurement, logistics, and maintenance. This P.E. attempts to solve this problem by developing common avionics for new programs and retrofit programs, if applicable. All acquisition approaches are followed for the least-cost solution to this need, including joint programs, GFE breakout of peculiar items for broad use, foreign and non-development item investigations (funded under those headings when appropriate) and, when practicable and cost effective, dedicated development efforts. These products have application to new architecture "integrated avionics" aircraft, and also older technology "black box" aircraft with major new efforts directed at bridging the gap between these technologies. This forward and retrofit application of common avionics technology is required to maximize aircraft capabilities at a minimum procurement and support cost. The program will specifically address in service out of production avionics with costly R&M deficiencies. This program also includes planning for the development of components/subsystems which have high reliability, which are easily maintained and which have low life cycle costs. An example of a past successful project under this program is the Standard Central Air Data Computer (SCADC) jointly developed with the Air Force and now in production to be the common system on Navy and Air Force aircraft. Using an integrated common module approach, the reliability of SCADC is 10 to 50 times greater than the 13 types of air data computers it replaces. This P.E. also funds Navy participation and activities involving the Joint Service Review Committee (JSRC) for Avionics Standardization.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604203N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Standard Avionics Development
PROJECT NUMBER: W0572 PROJECT TITLE: Joint Services/Navy Standard Avionics Components and Subsystems

A. (U) RESOURCES: (Dollars in Thousands)

Project Number	Title	FY 1990 Actual	FY 1991 Estimate	FY 1992 Estimate	FY 1993 Estimate	To Complete	Total Program
W0572	JT SRV/NAV STD AVCS	10,387	7,402	11,572	12,133	Cont.	Cont.

B. (U) DESCRIPTION: The Joint Service/Navy Standard Avionics Components and Systems (AVCS) project provides for the design, development, test, evaluation and qualification of standard avionics for Navy use and wherever practicable use across all services. The primary goal of the Standard Attitude Heading and Reference System (SAHRS) project, which enters full production in FY 91, is to reduce obsolete attitude heading references and proliferation of new development efforts to meet requirements of T-45, F-14D and Army's OV-1. Also during FY 90, specification, formulation and acquisition planning was initiated on similar efforts to identify future user needs and develop standard life cycle cost effective equipments such as Ground Proximity Warning Systems (GPWS); Standard Compass System (SCS), a joint program development with the Air Force C/AHRS program; Standard Automatic Flight Control System (SAFCS), Solid State Barometric Altimeter (SSBA) and Downed Aircrewman Locator System (DALS). Beginning in FY 92, the Low Probability of Intercept (LPI) Altimeter will be initiated with Air Force and Army participation. Future user needs analysis and demonstrations, including joint service requirements, will continue.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   - a. (U) Completed delivery of SAHRS FSED hardware.
   - b. (U) Completed Design Article Test (DAT) on SAHRS.
   - c. (U) Completed SAHRS TECHEVAL and OPEVAL.
   - d. (U) Obtained SAHRS Milestone IIIA (LRIP).
   - e. (U) Began GPWS (TACAIR) digital map (Penetrate) flight demonstration; GPWS (TACAIR) definition; GPWS (Helo) definition.
   - f. (U) Performed feasibility study for SAFCS.
   - g. (U) Completed DALS (ARS-6) TECHEVAL and OPEVAL.
   - h. (U) Obtained Milestone IIIA decision for DALS (ARS-6).
2. (U) FY 1991 Program:
   - a. (U) Complete specification development for GPWS (Helo).
   - b. (U) Perform qualification/integration testing for SSBA.
   - c. (U) Award SCS FSED contract.
   - d. (U) Continue qualification/integration testing for GPWS (TACAIR).
   - e. (U) Complete feasibility study for DALS implementation in ARC-210 Combo Radio.

PROGRAM ELEMENT: 0604203N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Standard Avionics Development
PROJECT NUMBER: W0572 PROJECT TITLE: Joint Services/Navy Standard Avionics Components and Subsystems

3. (U) FY 1992 Plans:
   a. (U) Specification development for LPI Altimeter.
   b. (U) Continue integration/qualification testing for GPWS (TACAIR).
   c. (U) Award FSED contract for GPWS (Helo).
   d. (U) Continue SCS FSED, begin qualification testing.
   e. (U) Perform and complete qualification testing for SSBA.
4. (U) FY 1993 Plans:
   a. (U) Complete integration/qualification testing for GPWS (TACAIR).
   b. (U) Complete TECHEVAL and OPEVAL for SCS.
   c. (U) Award FSED contract for LPI Altimeter.
5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRDEVCEN, Warminster, PA; NAVAIRTESTCEN, Patuxent River, MD; NAVAVIONICCEN, Indianapolis, IN. CONTRACTOR: SAHRS: Kearfott/Astronautics Corp., Little Falls, NJ; Northrop Corp., Boston, MA.; GPWS:(TACAIR): Ferranti, London, England; (Helo) TBD; DALS: Cubic Corporation, San Diego, CA,; Rockwell Collins, Cedar Rapids, IA,; SAFCS: G.E.; SCS, SSBA, and LPI Altimeter: TBD.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
   1. (U) Technology Changes: None.
   2. (U) Schedule Changes: None.
   3. (U) Cost Changes: None.

F. (U) PROGRAM DOCUMENTATION:

PROGRAM	TOR	OR	AP	TEMP
GPWS		1/87	DRAFT	DRAFT
SAHRS		N/A	7/89	11/88
SAFCS		4/86		
SCS		1/86	DRAFT	DRAFT
DALS		3/87	N/A	1/90
LPI	09/90			

G. (U) RELATED ACTIVITIES: A tri-service formal charter exists to promote joint development of standard avionics components and subsystems through the Joint Services Review Committee (JSRC) on Avionics Standardization. Separate JSRC memorandums of agreement have been established for the SAHRS, GPWS/GCAS, DALS, SCS, and SSBA and ARC-210. ARC-210 development is funded under PE 0204163N. Currently the Joint USAF/USN SCADC has received Approval for Full Production.

PROGRAM ELEMENT: 0604203N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Standard Avionics Development
PROJECT NUMBER: W0572 PROJECT TITLE: Joint Services/Navy Standard Avionics Components and Subsystems

H. (U) OTHER APPROPRIATION FUNDS:

APPN/P-1	FY 1990 Actual	FY 1991 Estimate	FY 1992 Estimate	FY 1993 Estimate	To Complete
APN/#4,9,5,20,26	Procurement justification material does not contain this level of detail.				Cont.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENT: Not Applicable.

J. (U) MILESTONE SCHEDULE:

	M/S I	M/S II	M/S IIIA	M/S IIIB
SAHRS	N/A	85/2Q	90/2Q	91/2Q
GPWS CATEGORY II	N/A	N/A	N/A	N/A
GPWS CATEGORY III	N/A	92/1Q	N/A	95/1Q
SAFCS	N/A	90/1Q	N/A	93/4Q
SCS	N/A	91/2Q	N/A	94/2Q
DALS	N/A	90/2Q	90/4Q	91/2Q
LPI	N/A	93/2Q	N/A	96/2Q

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604208N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Range Instrumentation and System Development
PROGRAM NUMBER: W0604 PROJECT TITLE: Trng Rng & Instr Dev

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0604	Range Instrumentation Systems Development	8,639	9,616	9,836	8,842	Cont.	Cont.

B. (U) DESCRIPTION: This project develops specialized instrumentation systems for fleet readiness training while minimizing life cycle costs. Tasks include the following systems: Range Electronic Warfare Simulators (REWS) and associated subsystems, Telemetry (TM), Target Control (TCS), Large Area Tracking Range (LATR), Laser Training, Weapons Impact Scoring Set (WISS), Advanced Weapons Training (AWTS), and Large Area Underwater Range (LAUR) Mobile and Fixed Open Ocean Instrumentation, Range Requirements (includes fleet identified emergent requirements).

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. Initiated LAUR, LATR, WISS development.
   b. Completed development of the Laser Evaluator System - Mobile (LES-M) and Large Scale Target Sensor System (LSTSS) Engineering Development Model (EDM). Commenced Testing.
   c. Initial Operational Capability (IOC) of REWS Threat Radar Simulator (TRS).
   d. Initiated Full Scale Development (FSD) of REWS Electronic Warfare Range Operations Center (EWROC) and multibeam TRS upgrade.
   e. Initiated review of long term Target Control Systems (TCS) requirements.
   f. Continued TM software development.
2. (U) FY 1991 Program:
   a. Continue LAUR, LATR, WISS, REWS, TCS, and TM.
   b. Initiate FSD of REWS Electronic Warfare Response Monitor (EWRM).
   c. Complete testing and fleet evaluation of LSTSS and LES-M EDM.
3. (U) FY 1992 Plans:
   a. Continue LAUR, LATR, WISS, REWS, TCS, and TM.
   b. Initiate Multiple Laser Evaluation System (MLES) development.
4. (U) FY 1993 Plans:
   a. Continue LAUR, REWS, and TCS.
   b. Complete development of LATR and MLES EDM, and WISS. Commence testing and fleet evaluation.
5. (U) Program to Completion: This is a continuing program.

D. (U) WORKED PERFORMED BY: IN-HOUSE: NAVOCEANSYSCEN, San Diego, CA; COMPACMISTESTCEN, Point Mugu, CA; NAVWPNCEN, China Lake, CA; NAVAIRTESTCEN, Patuxent River, MD; NAVAIRDEVCEN, Warminster, PA; NWACC, Corona, CA; NAVSWC, Dahlgren, VA; NUSC, Newport, RI. CONTRACTORS: SRI International, Menlo Park, CA; Bunker Ramo, Westlake, CA; MITRE Corp., Washington, DC; Ford Aerospace, Sunnyvale, CA; RCA, Moorestown, NJ; SAIC/MARIPRO, Goleta, CA.

E. (U) RELATED ACTIVITIES: None.

F. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
OPN/P-1 #183/194	5,613	8,496	13,086	10,678	Cont.	Cont.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604211N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: IDENTIFICATION, FRIEND OR FOE SYSTEMS DEVELOPMENT

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE
W0676	Improved ID Development	5,980	8,484	22,343	18,061	Cont.
W1253	Combat ID System	18,213	221	21,367	30,275	Cont.
	TOTAL	24,193	8,705	43,710	48,336	Cont.

B. (U) DESCRIPTION: Reliable and secure positive identification (ID) systems are essential elements of battle management in the naval environment. In addition to distinguishing friend from foe for weapons employment, the Navy requires secure, jam-resistant Identification Friend or Foe (IFF) systems for battle group air defense management and air traffic control. The resolution of the identification problem is of special interest to OSD; it is multifaceted and includes information received from several sensors (both cooperative and non-cooperative system). The Combat Identification System (CIS) project (W1253) covers the Navy development aspects of a cooperative question-and-answer IFF system which is the next-generation replacement for the aging MK XII IFF. The Improved Identification Development project (W0676) develops new Non-Cooperative Target Recognition (NCTR) techniques. This project was restructured to allow rapid fielding of prototypes called Shipboard Advanced Radar Target ID System (SARTIS), an NCTR system, on selected ships and AUTO-ID, a sensor kinematics/doctrine display system, for aircraft carriers and selected AAW ships. These prototype fieldings will start formal full-scale development of systems beginning in FY 1992, including the restructured Central IFF (CIFF) project which will provide the vehicle to integrate both cooperative and non-cooperative ID systems.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604211N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: IDENTIFICATION, FRIEND OR FOE SYSTEMS DEVELOPMENT
PROJECT NUMBER: W0676 PROJECT TITLE: IMPROVED ID DEVELOPMENT

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TOTAL PROGRAM
W0676	Improved ID Development	5,980	8,484	22,343	18,061	Cont.

B. ( ) DESCRIPTION: This project provides for the development and integration of Non-Cooperative Target Recognition (NCTR) techniques, and multi-sensor information integration systems for improved Identification (ID).

A secondary effort is rapid deployment of AUTO-ID which takes IFF track, link data and Kinematics/doctrine information to better ID/display targets; these features/displays will be incorporated into a restructured Central IFF (CIFF) full-scale development beginning in FY 1992.

Support for tri-Service programs in NCTR areas will return in FY 1992.

C. ( ) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. ( ) FY 1990 Accomplishments:
   a. ( )

   b. ( ) Supported tri-Service NCTR initially; commenced carrier installation and support of 4 AUTO-ID prototypes assembled by JHU-APL.

   c. (U) Commenced paperwork for restructured CIFF program with competitive award in FY 1992; drafted Acquisition plan and Test and Evaluation Master Plan (TEMP).

2. ( ) FY 1991 Program:
   a. ( )

   b. (U) Establish support infrastructure for installed AUTO-ID prototypes; install and support remaining 4 AUTO-ID units.

   c. (U) Continue procurement planning/preparation for restructured CIFF program and initiate paperwork for AN/SLQ-20 antenna effort in FY 1992.

3. ( ) FY 1992 Plans:
   a. ( )

   b. ( )

PROGRAM ELEMENT: 0604211N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: IDENTIFICATION, FRIEND OR FOE SYSTEMS DEVELOPMENT
PROJECT NUMBER: W0676 PROJECT TITLE: IMPROVED ID DEVELOPMENT

c. ( )

d. (U) Continue support of 8 AUTO-ID prototypes installed.

e. (U) Initiate full-scale development of restructured/enhanced CIFF; prepare for FSED of AN/SLQ-20 antenna and militarized SARTIS.

f. (U) Re-initiate support of tri-Service NCTR programs and technology investigations; initiate integration of SARTIS, AN/SLQ-20 and appropriate NCTR systems in CIFF by Pre-Planned Proposal (P3I).

4. ( ) FY 1993 Plans:

a. ( )
initiate insta'

b. ( )

c. ( )

d. (U) Continue FSED of CIFF, AN/SLQ-20 and militarized SARTIS; plan for incorporation of appropriate tri-Service NCTR capabilities.

e. (U) Initiate DT/OT testing of new CIFF EDMs.

5. *(U) Program to Completion:* This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: COMNAVAIRSYSCOM, COMNAVSPAWARSYSCOM(005-21), and COMNAVSEASYSCOM (PM400B), Washington, D.C.; NRL, Washington, D.C.; NAVOCEANSYSCEN, San Diego, CA; NAVAIRDEVCEN, Warminster, PA; NAVELEXACT, St. Inigoes, MD;
CONTRACTORS: Allied Signal Bendix Communications, Towson, MD; Scope, Inc., Reston, VA; The Johns Hopkins University Applied Physics Laboratory, Laurel, MD.

E. ( ) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) Technology Changes: None

2. (U) Schedule Changes: SARTIS and AUTO-ID priorities have delayed AN/SLQ-20 antenna development and support of tri-Service NCTR programs until FY 1992. Recent events in Southwest Asia established a priority for Auto-ID beginning in 4Q FY90; subsequently, a HAC/SAC mark (without predjudice) for FY91 reduced SARTIS effort resulting in additional schedule delay. SARTIS prototype delivery for test slipped to FEB 91 but IOC in FY92 is still feasible.

3. ( ) Cost Changes:

F. (U) PROGRAM DOCUMENTATION: O.R. (NCTR) 2/86; RDC (SARTIS) 1/90; AP and TEMP (CIFF) redrafted 4/90.

PROGRAM ELEMENT: 0604211N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: IDENTIFICATION, FRIEND OR FOE SYSTEMS DEVELOPMENT
PROJECT NUMBER: W0676 PROJECT TITLE: IMPROVED ID DEVELOPMENT

G. (U) RELATED ACTIVITIES: P.E. 0603742F, Combat ID Systems; P.E. 0604790A, IFF Equipment.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands) Funding applicable to FY 98.

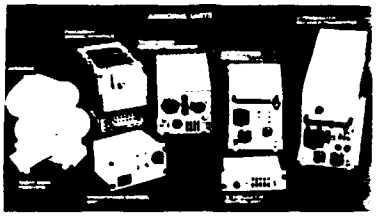
I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable

J. ( ) MILESTONE SCHEDULE

CIFF:	MSII 1Q/86	MSIIIA 2Q/94	MSIIIB 4Q/95

PROGRAM ELEMENT: 0604211N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: IDENTIFICATION FRIEND OR FOE SYSTEMS
PROJECT NUMBER: W1253 PROJECT TITLE: COMBAT ID SYSTEM
POPULAR NAME: MARK XV (USAF LEAD)/NEXT GENERATION IFF (NAVY LEAD)

MARK-XV IFF System



A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	TO COMPLETE
PROGRAM MILESTONES	USAF	USAF	USN	USN	II-A
ENGINEERING MILESTONES	PDR (4Q/90)	CDR (4Q/91)			
T&E MILESTONES					DT&E/IOT&E
CONTRACT MILESTONES				LRIP	FULL PROD

BUDGET ($K)	FY 1990	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL TO COMPLETE
MAJOR CONTRACT	2,326	0	9,890	18,100	
SUPPORT CONTRACT	1,320	0	400	500	CONTINUING
IN-HOUSE SUPPORT	14,567	221	11,077	11,675	CONTINUING
GFE/OTHER					
TOTAL	18,213	221	21,367	30,275	CONTINUING

PROGRAM ELEMENT: 0604211N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: IDENTIFICATION FRIEND OR FOE SYSTEMS
PROJECT NUMBER: W1253 PROJECT TITLE: COMBAT ID SYSTEM

B. (U) DESCRIPTION: Although the MK XV IFF system under USAF lead is being terminated , USN continues to have the requirement for a Next-generation IFF (NGIFF) system that would be redeveloped in accordance with existing NATO STANAG, to provide a secure, jam-resistant, question-and-answer Identification (ID) system. On 17 Jan 90, OP-094 signed a memo to retain USN funds for the Navy next-generation IFF because Navy has the greatest need for a replacement for the aging MK XII system.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

a. (U) Supported tri-Service effort for ASD(C3I) review of program and alternatives; scaled down previous effort pending outcome of review.

b. (U) Supported DEPSECDEF direction on studying design alternatives for cost reduction and coordinating with NATO.

c. (U) Incremented/Awarded Navy "unique" platform contract for information transfer, interface control and integration on E-2C and F-14.

2. (U) FY 1991 Program:

a. (U) Participate in redirected tri-Service full-scale development effort including design/performance impacts/changes and associated life-cycle costing (Tri-Service Annual Estimate update of platforms, schedule and costs) and JCS/NATO coordination. MK XV program under USAF lead is being terminated by PBD 727.

b. (U) Review Navy requirements and assess impacts to Navy platformas. Respond to anticipated OSD requests to study alternatives for next-generation IFF.

c. (U) Initiate sole-source contracts to recoup applicable technology developed under the MK XV program.

3. ( ) FY 1992 Plans:

a. (U) Complete/Award sole-source contracts to recoup applicable technology developed under the MK XV program.

b. (U) Develop specifications, SOW, RFP, etc., for Navy competitive FSD contract designed to include new COMSEC, Mode S Level II, increased range and reliability.

c. ( ) Prepare for Milestone II-A

PROGRAM ELEMENT: 0604211N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: IDENTIFICATION FRIEND OR FOE SYSTEMS
PROJECT NUMBER: W1253 PROJECT TITLE: COMBAT ID SYSTEM

4. ( ) FY 1993 Plans:
   a. (U) Complete Milestone II-A.
   b. (U) Award competitive FSD contract.
   c. (U) Begin preparations for System Design Review.

5. ( ) Program to Completion:
   a. (U) Develop/fabricate EDMs; test and evaluate systems.
   b. (U) Complete Milestone III and begin full-scale production.

D. (U) WORK PERFORMED BY: IN-HOUSE: COMNAVAIRSYSCOM, COMNAVSEASYSCOM, and COMSPAWARSYSCOM, Washington, DC; NRL, Washington, DC; NAVELEXACT, St. Inigoes, MD; NAVOCEANSYSCEN, San Diego, CA; NAVAVIONICCEN, Indianapolis, IN; NAVAIRDEVCEN, Warminster, PA; NAVAIRTESTCEN, Patuxent River, MD; CONTRACTORS (USAF FSED): Allied Signal/Bendix Communications, Towson, MD; Raytheon Corporation, Marlborough, MA; OTHERS (Navy) Allied Signal/Bendix, Towson, MD; Grumman Aircraft Corp, Bethpage, NY; McDonell Douglas, St. Louis, MO.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Design modifications for Navy program.

2. (U) Schedule Changes: N/A.

3. (U) Cost Changes: None.

F. (U) PROGRAM DOCUMENTATION: JCS MROC 20-83; DOD AIMS STANAG 4193.

G. (U) RELATED ACTIVITIES: P.E. 0604725F Combat ID Systems; P.E. 0604790A, IFF Equipment.

PROGRAM ELEMENT: 0604211N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: IDENTIFICATION FRIEND OR FOE SYSTEMS
PROJECT NUMBER: W1253 PROJECT TITLE: COMBAT ID SYSTEM

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE
(U) PROCUREMENT APPN					
OPN # 0202851*	9,106	8,744	13,772	8,829	Cont.
APN # 0204161	NOT APPLICABLE				Cont.

* Includes MK XIII R&M improvements and procurement of existing systems.

(U) MILCON

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: The MK XV program under USAF lead was covered by three Memoranda of Understanding.

- MOU with Italy for Cooperative FSED of MK XV IFF.
  - US signed on 1 Feb 89.
  - Specifies Italian role and contributions in USAF FSED, subsequent co-production in Italy.
- MOU for Cooperation in Development and later Stages of the NATO ID System.
  - Signed by US, Canada, Belgium, Denmark, France, Germany, Italy, Spain, Turkey, United Kingdom, Netherlands.
  - US signed on 10 October 1986.
  - Covers data exchanges to assess potential for cooperative development.
- MOU Concerning Activities Necessary for Cooperative Development of the NATO ID System (Q&A Component).
  - Signed by US, France, Germany, Italy, United Kingdom.
  - US signed 20 October 1987.
  - Covers cooperation in testing, use of common subcomponents, frequency allocation and other areas.

J. (U) TEST AND EVALUATION: No new T&E results since Dem/Val in FY 1988.

FY 1992 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604212N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Light Airborne Multi-Purpose System MK III

A. (U) RESOURCES: (Dollars in thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W1707	LAMPS Improvement	210	23,437	30,215	39,930	CONT.	CONT.
W1902	PENGUIN	9,652	0	0	0	0	72,288
	TOTAL	9,862	23,437	30,215	39,930	CONT.	CONT.

B. (U) DESCRIPTION: Light Airborne Multi-Purpose System (LAMPS) MK III is a computer integrated ship/helicopter system that greatly increases the effectiveness of surface combatants in anti-submarine warfare (ASW) and anti-surface warfare (ASUW) with secondary missions of search and rescue, medical evacuation, vertical replenishment and communications relay. For ASW, the LAMPS MK III is a remote platform for deployment of sonobuoys, torpedoes and processing of acoustic and non-acoustic sensor information. For ASUW, LAMPS MK III serves as an elevated platform for radar and electronic support measures and will carry MK 2 Mod 7 Penguin missiles. The hosting platform (ship), through a directional data link provides sensor processing, command and control, and integrates all LAMPS information gained from sensors. The ship also provides Recovery Assist, Securing and Traversing System, visual landing aides, and maintenance/support facilities for the aircraft.

FY 1992 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604212N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Light Airborne Multi-Purpose System MK III
PROJECT NUMBER: W1707 PROJECT TITLE: LAMPS Improvement

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W1707	LAMPS	210	23,437	30,215	39,930	CONT.	CONT.

B. (U) DESCRIPTION: Block I Upgrade of LAMPS increases sonobuoy receiver channel capability from 31 to 99, thus increasing operational flexibility in a multi-platform anti-submarine warfare (ASW) environment; modifies the SH-60B armament system to accommodate the MK-50 torpedo increasing attack effectiveness; adds hardware and software provisions for the Global Positioning System (GPS) greatly enhancing the on board navigational accuracy of the SH-60B and significantly improving the effectiveness of all mission areas. A Flight Incident Recorder (FIR) will also be added to aid in post mishap reconstruction. The Block II Upgrade will enter full scale engineering development and represents a major avionics modification to the SH-60B which will greatly enhance both primary mission areas of ASW and anti-surface warfare (ASUW). To enhance ASW effectiveness the Airborne Low Frequency Sonar (ALFS) will be added to the existing acoustic suite. ASUW effectiveness will be improved with the addition of an Inverse Synthetic Aperture Radar (ISAR) which will permit stand-off classification of hostile threats. Improved platform interoperability will be achieved by equipping SH-60B's with a tactical data transfer system which permits rapid, secure transfer of mission information between air and surface units. Provisions for an integrated self-defense package is also included. Both LAMPS MK III Block Upgrades improve the capability of the LAMPS MK III Weapons System to provide Battle Group protection as well as respond to Low Intensity Conflicts (LIC) and Contingency and Limited Objective Warfare (CALOW) mission needs.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:
   a. (U) Continued testing of FIR.
   b. (U) Draft specifications, statement of work written for Block II.

2. (U) FY 1991 PROGRAM:
   a. (U) Complete FIR testing.
   b. (U) Begin Block II Phase I development which includes detailed system specification development and interface control document development in preparation for Milestone II decision and Block II Phase II Full Scale Engineering Development.

PROGRAM ELEMENT: 0604212N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Light Airborne Multi-Purpose System MK III
PROJECT NUMBER: W1707 PROJECT TITLE: LAMPS Improvement

c. (U) Procure initial ALFS Engineering Development Model (EDM).
d. (U) Procure initial GFE acoustic signal processor.

3. (U) FY 1992 PLANS:
a. (U) Commence Block II, Phase 2 Full Scale Engineering Development:
- Begin systems integration design of ALFS and acoustic signal processor.
- Begin competitive development of ISAR radar.
- Begin design and integration of Tactical Data Transfer (TDT).
- Begin systems integration of Integrated Self Defense (ISD) equipment.
b. (U) Initiate detailed development test planning.
c. (U) Procure three additional ALFS and GFE acoustic processor EDMs for aircraft integration.
d. (U) Begin design of Block II aircraft modification.

4. (U) FY 1993 PLANS:
a. (U) Continue Block II development and aircraft modification design as described above.
b. (U) Conduct Preliminary Design Review.
c. (U) Conduct Critical Design Review.
d. (U) Begin detailed DT/OT test preparations.

5. (U) PROGRAM TO COMPLETION:
a. (U) Complete development and aircraft integration. (FY 95)
b. (U) Conduct environmental testing. (FY 95/96)
c. (U) Conduct contractor flight tests. (FY 95)
d. (U) Conduct reliability testing. (FY 95/96)
e. (U) Conduct DT/OT. (FY 95/96/97)
f. (U) Correct testing deficiencies. (FY-97)
g. (U) This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NADC, Warminster, PA; NATC, Patuxent River, MD; NAC, Indianapolis, IN; FCDSSA, Dam Neck, VA; NRL, Washington DC. CONTRACTORS: International Business Machines, Owego, NY; Sikorsky, Stratford, CT; AT&T, Greensboro, NC.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
1. (U) Technology Changes: None
2. (U) Schedule Changes: MS II schedule adjusted from second to fourth quarter FY 91 to reflect delay in ALFS source selection in order to request and evaluate alternate processors.
3. (U) Cost Changes: FY 1991 funding increased to add upgraded Electronic Support Measures (ESM) to the Block II upgrade.

PROGRAM ELEMENT: 0604212N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Light Airborne Multi-Purpose System MK III
PROJECT NUMBER: W1707 PROJECT TITLE: LAMPS Improvement

F. (U) PROGRAM DOCUMENTATION: BLOCK II - OR 4/88, PMP 8/88, AP 6/90, TEMP (estimated completion) 8/91.

G. (U) RELATED ACTIVITIES:
- -P.E. 0604219N, CV Helo Avionics Improvements (integration of ALFS with the SH-60F.)
- -P.E. 0604507N, Navy Standard Signal Processor (integration with ALFS system.)
- -P.E. 0604261N, Acoustic Search Sensors

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

(U) PROCUREMENT APPN P-1	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
APN-1 #17,18	177,108	166,525	243,961	270,848	CONT	CONT
APN-5 #44	599	43,815	20,969	47,549	CONT	CONT

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable

J. (U) MILESTONE SCHEDULE:

BLOCK II

MSII FY 91
MSIII FY 97

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604213N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: HELICOPTER DEVELOPMENT

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMP.	TOT. PROG.
W1378	AH-1 ACFT	17,304	14,432	11,622	11,987	CONT.	CONT.
W2088	MLR ACFT	0	0	51,499	73,381	CONT.	CONT.
	TOTAL	17,304	14,432	63,121	85,368	CONT.	CONT.

B. (U) DESCRIPTION: This program funds the upgrade and modernization of the AH-1 COBRA and the development of the Medium Lift Requirement (MLR) aircraft, a replacement for the CH-46. Efforts on the COBRA will include the development of a Night Targeting System (NTS) to permit night or reduced visibility operations, and development of a new improved Wing Tip Station which will allow the simultaneous carriage of air-to-ground and air-to-air weapons without mission degradation. The MLR effort will develop a capability to deliver combat assault troops beyond current CH-46 distances, under extreme environmental and operational conditions, in a high threat environment.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604213N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: HELICOPTER DEVELOPMENT
PROJECT NUMBER: W1378 PROJECT TITLE: AH-1 AIRCRAFT

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMP.	TOT. PROG.
W1378	AH-1 ACFT	17,304	14,432	11,622	11,987	CONT.	CONT.

B. (U) DESCRIPTION: The mission of the AH-1W attack helicopter is to provide close-in fire support and fire support coordination in aerial and ground escort operations during the ship-to-shore phase of amphibious operations and during subsequent operations ashore. Armed with an impressive array of weapons, the AH-1W is limited, however, in its ability to acquire and attack enemy targets at night or during conditions of reduced visibility. The Night Targeting System (NTS) will incorporate targeting for the TOW/TOW 2 missile system, Hellfire missile system, the turreted gun, laser range finder/designator, and day/night sensors with appropriate stabilization/target tracking capabilities. Beginning in FY 1991, FSD efforts will commence on a new Wing Tip Station that will provide the AH-1 an air-to-air missile capability without losing an anti-armor missile station. Currently, the AH-1W cannot carry both Hellfire and Sidewinder/ Sidearm missiles on the same stub wing.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. (U) Critical Design Review conducted.
   b. (U) Fabricated Night Targeting System (NTS) prototypes.
   c. (U) Began NTS aircraft integration of prototype.
   d. (U) Began engineering effort for aircraft NTS modification.
2. (U) FY 1991 Program:
   a. (U) Complete NTS contractor testing.
   b. (U) Complete NTS aircraft prototype integration
   c. (U) Check-out and ground tests performed.
   d. (U) Complete DT-IIA and OT-IIA.
   e. (U) Begin DT-IIB.
   f. (U) Begin Wing Tip Station design and development efforts.
   g. (U) NTS (USMC) trial kit approval.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604213N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: HELICOPTER DEVELOPMENT
PROJECT NUMBER: W1378 PROJECT TITLE: AH-1 AIRCRAFT

3. (U) FY 1992 Program:
   a. (U) DT-IIB and OT-IIB completion August 1992.
   b. (U) NTS validation and verification completion for first two (USMC) trial kits.
   c. (U) Wing Tip Station integration/DT testing.
4. (U) FY 1993 Plans:
   a. (U) Wing Tip Station OT completion.
   b. (U) MS-III decision.
5. (U) Program to Completion:
   a. (U) This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVWPNCEN, China Lake, CA; COMPACMISTESTCEN, Pt. Mugu, CA; NAVAIRTESTCEN, Patuxent River, MD; NADS, Pensacola, FL; and NADS, Jacksonville, FL. CONTRACTORS: Israel Aircraft Industries, Tamam Plant, Yahud Industrial Zone, Israel; Kollsman, Merrimack, NH; Bell Helicopter, Textron, Inc., Ft. Worth, TX.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
1. (U) TECHNOLOGY CHANGES: None.
2. (U) SCHEDULE CHANGES: None.
3. (U) COST CHANGES: None.

F. (U) PROGRAM DOCUMENTATION:

OR (NTS)	12/85
MOU	8/87
AP	8/88
TEMP	4/87
OR (Wing Tip)	4/88

G. (U) RELATED ACTIVITIES: Not applicable.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMP.	TOT. PROG.	
(U) PROCUREMENT							
APN-5	48,041	51,424	118,201	61,843	CONT.	CONT.	NTS
Peculiar 762	40,477	47,579	45,700	CONT.	CONT.		
Quantity		(2)	(18)	(18)			

(U) MILCON--Not Applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604213N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: HELICOPTER DEVELOPMENT
PROJECT NUMBER: W1378 PROJECT TITLE: AH-1 AIRCRAFT

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: By Memorandum of Understanding dated August 1987, the United States Government and the Government of Israel are jointly developing the Night Targeting System for integration of the AH-1W and the IAH-1S, respectively. Common development costs are shared on a two-thirds/one-third basis. Unique costs such as aircraft modification are the responsibility of the requiring country.

J. (U) MILESTONE SCHEDULE:

NIGHT TARGETING SYSTEM	DATE
Milestone IIA (ARB)	7/88
FSD Contract Award	9/88
Preliminary Design Review	4/89
Critical Design Review	11/89
Trial Kit Procurement	1/91
Initial Flight Test	4/91
DT/OT IIA Completed	8/91
Milestone IIIA (Limited Prod.)	10/91
DT/OT IIB Completed	8/92
Milestone IIIB (Full Prod.)	9/92
WING TIP STATION	
FSD contract award/design efforts begin	4/91
Design reviews/aircraft integration begins	10/91
DT testing performed	4/92
OT testing completed	5/93
Milestone III (Full Prod.)	9/93

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604213N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Medium Lift Replacement
PROJECT NUMBER:W2088 PROJECT TITLE: Medium Lift Replacement

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY1990	FY1991	FY1992	FY1993	TO COMPLETE	TOTAL PROGRAM
W2088	MLR A/C	0	0	51,499	73,381	Cont.	Cont.

B. (U) DESCRIPTION: The MLR is a replacement aircraft for the CH-46. The MLR's primary mission will be to provide assault transport of combat troops during amphibious operations and subsequent operations ashore. The aircraft will have the capability to operate at night, in adverse weather, in a Nuclear-Biological-Chemical environment and over long distances in a high threat environment. The proposed configuration of this aircraft is unknown at this time.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Not Applicable.
2. (U) FY 1991 Program: Not applicable.
3. (U) FY 1992 Plans:
   a. Award development contract
   b. Design and fabricate test articles.
4. (U) FY 1993 Plans:
   a. Continue design and fabrication with CDR in last quarter.
   b. Preliminary Design Review.
5. (U) Program to Completion:
   a. Government participation in systems testing.
   b. First flight will be second quarter '95.
   c. Long lead contract award in first quarter '97.
   d. OPEVAL in fourth quarter '96.
   e. Milestone III in first quarter '98.
   f. Contract award second quarter '98.
   g. This will be a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIR, Washington D.C.; NAVAIRTESTCEN, Patuxent River, Maryland; NAVAVIONICCEN, Indianapolis, Indiana; NAVAIRENGCEN, Lakehurst, New Jersey; NAVAIRTECHSERFAC, Philadelphia, Pennsylvania; NAVAIRDEVCEN, Warminister, Pennsylvania. CONTRACTORS: TBD.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604213N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Medium Lift Replacement
PROJECT NUMBER: W2088 PROJECT TITLE: Medium Lift Replacement

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
1. (U) Technology Changes: None.
2. (U) Schedule Changes: None.
3. (U) Cost Changes: FY 1991 decrease of $51 Million due to Congressional action.

F. (U) PROGRAM DOCUMENTATION: None

G. (U) RELATED ACTIVITIES: None

H. (U) OTHER APPROPRIATION FUNDS: None

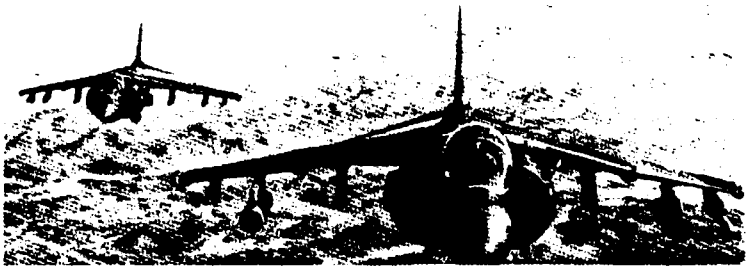
I. (U) INTERNATIONAL COOPERATION AGREEMENTS: None.

J. (U) MILESTONE SCHEDULE:

	Qtr/Yr
a. Milestone II	2/92
b. FSD contract award	4/92
c. PDR	1/93
d. CDR	4/93
e. AAC	1/97
f. TECHEVAL	2/96
g. OPEVAL	4/96
h. Milestone III	1/98
i. Production contract award	2/98

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604214N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AV-8B AIRCRAFT (ENGINEERING)
PROJECT NUMBER: W0652 PROJECT TITLE: AV-8B



POPULAR NAME: HARRIER

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	TO COMPLETE
PROGRAM MILESTONES	Night Attack IOC 5/90	OMNI-7 *RTF 7/91	OMNI-8 *RTF 12/91		RADAR IOC 20/94
ENGINEERING MILESTONES	ALE-39 INTEG.	AGM-122A INTEG. RADAR CDR 8/91	AIM-9R INTEG.	AGM-88 INTEG.	
T&E MILESTONES	408/LERX OFP S/W	COMM RDR INTEG. 11/90	1ST FLT RDR 9/92	DT-IIIB RDR COMP 9/93	DT-IIIC RDR COMP 20/94
CONTRACT MILESTONES	-408 AWD 11/89	-408 AWD 11/90 RADAR AWD 11/90			

BUDGET ($K)	FY 1990	FY 1991	FY 1992	FY 1993	Program Total To Complete
MAJOR CONTRACT	19,991	25,918	2,300	2,800	Continuing
SUPPORT CONTRACT	525	0	900	944	Continuing
IN-HOUSE SUPPORT	5,705	4,246	5,310	6,022	Continuing
GFE/ OTHER	326	321	976	866	Continuing
TOTAL	26,547	30,485	9,486	10,632	Continuing

*Release to Fleet

PROGRAM ELEMENT: 0604214N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AV-8B AIRCRAFT (ENGINEERING)
PROJECT NUMBER: W0652 PROJECT TITLE: AV-8B

B. (U) DESCRIPTION: The AV-8B will meet the Marine Corps requirements for a light attack aircraft to provide responsive offensive air power that can operate from austere forward sites in direct support of ground forces. The AV-8B is an improved vectored thrust aircraft, based on the AV-8A concept and powered by the F402-RR-406 engine, that has up to twice the range and payload of the AV-8A/C. It combines aerodynamic improvements with the Angle Rate Bombing System for increased weapon delivery accuracy, and a new stability augmentation system to reduce pilot workload. A two-seat training version is designated the TAV-8B. A Night Attack System for the AV-8B has been developed and is in service. A development effort is underway to integrate a multimode radar into the AV-8B Night Attack System to provide enhanced air-to-ground and air-to-air mission capability.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:

a. (U) Continued on-going Pre-Planned Product Improvement (P^3I) projects.

b. (U) Continued weapons integration/envelope expansion with upgraded AV-8B and AV-8B Night Attack System Operational Flight Program (OFP) software (ALE-39/TACTS). OMNI-6+ Released to Fleet (RTF) 5/90 concurrent with Night Attack IOC.

c. (U) Continued TAV-8B and Night Attack deficiency correction testing.

d. (U) Continued F402-RR-408 engine testing.

e. (U) Continued 100% Leading Edge Root Extension (LERX) testing.

f. (U) Awarded -408 Engine Development Contract 11/89.

2. (U) FY 1991 PROGRAM:

a. (U) Continue on-going P^3I projects.

b. (U) Continue weapons integration/envelope expansion with upgraded AV-8B and AV-8B Night Attack System OFP software (SIDEARM AGM-122A). OMNI-7 RTF 7/91. OMNI-8 RTF 12/91.

c. (U) Complete 100% LERX/F402-RR-408 engine testing.

d. (U) Award -408 Engine Development Contract 11/90.

e. (U) Award Radar/Integration Contract 11/90. Initial contract award with Foreign funds per MOU.

f. (U) Commence Radar Integration (Engine/Avionics/Airframe).

3. (U) FY 1992 PLANS:

a. (U) Continue on-going P^3I projects.

b. (U) Continue weapons integration/envelope expansion.

c. (U) Commence Radar Integration Flight Testing 9/92.

4. (U) FY 1993 PLANS:

a. (U) Continue on-going P^3I projects.

b. (U) Continue weapons integration/envelope expansion with upgraded AV-8B and AV-8B Night Attack System OFP software (AGM-88 HARM).

c. (U) Continue Radar Integration flight testing. R1 S/W RTF 4/93; R2 S/W RTF 7/93.

PROGRAM ELEMENT: 0604214N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AV-8B AIRCRAFT (ENGINEERING)
PROJECT NUMBER: W0652 PROJECT TITLE: AV-8B

5. (U) PROGRAM TO COMPLETION: This is a continuing program

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRTESTCEN, Patuxent River, MD; NAVWPNCEN, China Lake, CA; NAVAIRDEVCEN, Warminster, PA; NAVAIRPROPCEN, Trenton, NJ; NAVAVIONICCEN, Indianapolis, IN. CONTRACTOR: McDonnell Douglas Corporation, Saint Louis, MO.; Rolls Royce, Bristol, United Kingdom; Hughes Aircraft Company, Los Angeles, CA.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) Technology Changes: None.
2. (U) Schedule Changes: None.
3. (U) Cost Changes: Not Applicable.

F. (U) PROGRAM DOCUMENTATION:

OR AV-8B 10/75; Night Attack 10/84; RADAR 8/88
DCP 160 Rev 1/87
PMP (RADAR) 7/90
TEMP AV-8B Rev 5/89; RADAR 12/90

G. (U) RELATED ACTIVITIES: Not Applicable.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT.						
APN-1	448,659	440,300	22,659	0	0	6,176,100
APN-5	9,572	9,401	19,700	9,977	81,200	180,200
APN-6	83,500	77,547	600	0	0	678,900
Quantity	(24)	(24)	0	0	0	(276)
(U) MILCON	0	0	0	0	0	8,300

PROGRAM ELEMENT: 0604214N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AV-8B AIRCRAFT (ENGINEERING)
PROJECT NUMBER: W0652 PROJECT TITLE: AV-8B

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS:

- A Memorandum of Understanding between the Governments of the United States (USG) and the United Kingdom (UKG) entitled the "AV-8B/GR5 Agreement" was signed in 1981. The MOU arranged for the UKG to join the program and produce an aircraft substantially similar to the AV-8B. An extension of the signed MOU detailing AV-8B Night Attack cooperative development was signed in July 1987.

- Under the Agreement the USG and UKG fund their own program and share in the cost of changes common to AV-8B and GR5 aircraft. USG procures AV-8B aircraft from McDonnell Aircraft Company who subcontracts the Aft Fuselage from British Aerospace. The UKG procures its GR5 aircraft from British Aerospace who subcontracts the Forward Fuselage and Wing from McDonnell Aircraft Company.

- Development efforts for the AV-8B, TAV-8B and AV-8B Night Attack System are nearing completion. Production deliveries of the AV-8B began in FY-84, TAV-8B production deliveries began in FY-87, production deliveries of the AV-8B Night Attack System began in September 1989.

- The Secretary of the Navy has approved a cooperative program with the Government of Spain (GOS) and the Government of Italy (GOI) for full integration of a radar in the AV-8B Weapon System and the production and life cycle support of a radar equipped AV-8B aircraft. A Memorandum of Understanding (MOU) with the GOS/GOI for the full integration of the APG-65 radar in the AV-8B aircraft was signed in September 1990. It is anticipated that negotiation of the production and support MOU will be completed in May 1991.

J. (U) TEST AND EVALUATION: This information is included in the FY 1992 Congressional Data Sheets.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604215N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Support Equipment

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0601	Aircraft Handling and Service Equipment	1,296	4,672	4,386	4,382	Continuing	
W0852	Consolidated Automated Support System (CASS)	50,038	11,949	10,157	9,475	Continuing	
W1842	Aircraft Gas Turbine Facility	281	2,035	1,875	0	0	4,191
S1857	Calibration Standards	1,170	4,017	1,700	1,986	Continuing	
	TOTAL	52,785	22,673	19,718	17,443	Continuing	

B. (U) DESCRIPTION: Aircraft Handling and Servicing Equipment is a Naval Aviation program to develop the common support equipment required to support new technology aircraft. CASS will design and develop modularly-constructed automated test equipment with computer assisted, multi-functional capability based on standardized hardware and software elements. Aircraft Gas Turbine Test Facility is a DoD joint program to develop a Standard Gas Turbine Test Facility to support future Navy and Air Force requirements. Calibration (CAL) Standards is a Navy-wide program to develop required field level calibration standards (hardware) in all major measurement technology areas.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604215N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Support Equipment
PROJECT NUMBER: W0601 PROJECT TITLE: A/C Handling & Service Eqp.

C. (U) **DESCRIPTION:** This project improves fleet readiness by application of new technology to DOD support equipment systems.

D. (U) **PROGRAM ACCOMPLISHMENTS AND PLANS:**

1. (U) FY 1990 Accomplishments: Commenced design of an advanced, Standardized Engine Test System (SETS) which will reduce current engine test times and improve testing results, thereby: (1) saving manpower and cost; and (2) leading to improved engine performance. The unit will be capable of efficiently testing all types of gas turbine engines.

2. (U) FY 1991 Program:

a. (U) Engine Testing Capability - Begin construction of SETS prototypes.

b. (U) Large Area Composite Inspection System (LACIS) - Develop, test and evaluate prototypes for Imaging Ultrasonic Scanner for field use on composite aircraft structures. Unit will provide permanent record of inspections to allow tracking of flaw growth.

c. (U) Hand-Held Ultrasonic Unit - Develop and build prototype units which will provide increased thickness measurement and capability to detect skin-to-core debonds in composite structures.

3. (U) FY 1992 Plans:

a. (U) Engine Testing Capability - Deliver SETS prototypes.

b. (U) LACIS - Contractor testing and delivery of prototypes

c. (U) Hand-Held Ultrasonic Unit - Deliver prototypes and commence testing.

d. (U) Commence development efforts for programs such as:

- Expeditionary Aircrew Breathing Oxygen Analysis System - Will provide capability to field test aircrew oxygen.
- Expeditionary Cryogenic Storage Tank Purge Unit - Will prevent wasteful "Lox washing" of O_2/N_2 storage tanks.
- Non-Destructive Inspection (NDI) Data Analysis System - Will provide the capability for computerized go/no-go recommendations based on inspection results and historical trends.

4. (U) FY 1993 Plans:

a. (U) Test and evaluate SETS prototypes.

b. (U) Continue efforts initiated in previous year.

5. (U) Program to Completion: This is a continuing program.

E. (U) **WORK PERFORMED BY:** IN-HOUSE: NAVAIRENGCEN, Lakehurst, NJ, and Naval Aviation Depots.
CONTRACTORS: NONE.

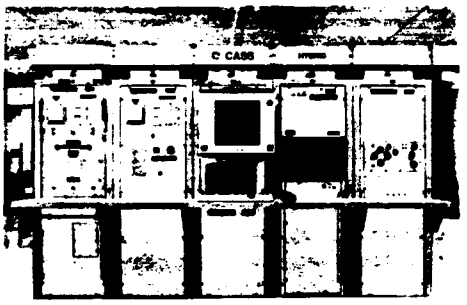
F. (U) **RELATED ACTIVITIES:** The individual projects encompassed in this program are a Navy lead responsibility. Some projects are a part of a coordinated Tri-Service effort endorsed, supported and directed by the Joint Logistics Commanders. There is no unnecessary duplication of effort within the Navy or the Department of Defense.

G. (U) **OTHER APPROPRIATION FUNDS:** This is a non-acquisition program.

H. (U) **INTERNATIONAL COOPERATIVE AGREEMENTS:** Not Applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604215N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Support Equipment
PROJECT NUMBER: W0852 **PROJECT TITLE:** Consolid. Auto. Spt. Sys. (CASS)



POPULAR NAME: CASS

A. (U) *SCHEDULE/BUDGET INFORMATION:* (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	TO COMPLETE
Program Milestones	IIIA 9-90	IIIB 6-91	IOC 8/92		
Engineering Milestones	FCA 4-90	PCA 5-91			
T&E Milestones	DT-IIC 4-90 OT-IIA 4-90/OT-IIB 3-91				
Contract Milestones	LPO 9-90	FPO 9-91			

BUDGET ($K)	FY 1990	FY 1991	FY 1992	FY 1993	Program Total
Major Contract	44,080	10,000	8,935	8,325	Continuing
Support Contract	872	237			Continuing
In-House Support	4,882	1,612	1,222	1,150	Continuing
GFE/ Other	204	100			Continuing
TOTAL	50,038	11,949	11,757	11,075	Continuing

PROGRAM ELEMENT: 0604215N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Support Equipment
PROJECT NUMBER: W0852 **PROJECT TITLE:** Consolid. Auto. Spt. Sys. (CASS)

B. (U) DESCRIPTION: This project will design and develop modularly-constructed automated test equipment with computer-assisted, multi-functional capability based on standardized hardware and software elements. It evolved in response to Fleet Commanders' expressed concerns regarding serious deficiencies in existing automatic test equipment and the recommendations of an extensive 1976 SECNAV Study report on test equipment. Program objectives are: (1) increase material readiness; (2) reduce life cycle costs through standardization of equipment and all logistics elements; (3) improve tester sustainability at depot and intermediate (including aircraft carriers) maintenance levels; (4) reduce proliferation of unique test equipment; and (5) provide Navy-wide test capability for existing and future avionic/electronic support requirements. With test stations that can be easily configured to satisfy different test requirements (i.e., electro-optical, radio frequency, laser, infrared, inertial navigation, etc.) and design provisions which permit modification to meet the demands of future technology, this tester system will increase repair facility throughput capability, reduce spare parts and personnel training requirements, and significantly reduce the space required for avionics testing in the critically space-limited Navy aircraft carriers.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. (U) Fabricated, assembled, integrated and tested pre-production units.
   b. (U) Integrated Operational Test Program Sets (OTPS).
   c. (U) Completed DT-IIB testing.
   d. (U) Delivered ILS Maintenance Plan.
   e. (U) Completed Functional Configuration Audit (FCA).
   f. (U) Initiated the design and development of assets for a Missile Test Station (MTS).
   g. (U) Completed TECHEVAL (DT-IIC) and PRE-OPEVAL (OT-IIA).
   h. (U) Obtained approval for and began limited production.

2. (U) FY 1991 Program:
   a. (U) Complete OPEVAL (OT-IIB).
   b. (U) Complete certification of a dual competitive source for full production.
   c. (U) Complete Physical Configuration Audit (PCA).
   d. (U) Obtain approval for and begin full production.
   e. (U) Continue the design and development of assets for a Missile Test Station (MTS).

3. (U) FY 1992 Plans:
   a. (U) Continue the design and development of assets for a Missile Test Station (MTS).

PROGRAM ELEMENT: 0604215N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Support Equipment
PROJECT NUMBER: W0852 PROJECT TITLE: Consolid. Auto. Spt. Sys. (CASS)

b. (U) Commence Pre-Planned Product Improvement (P^3I) program. The reconfigurable CASS design architecture will accommodate changes in airwing mix or modifications to existing weapon systems thereby avoiding obsolescence and the need for new testers, and also allows for the incorporation of new technology without impact to application software which has already been developed.

4. (U) FY 1993 Plans:

a. (U) Continue the design and development of assets for a Missile Test Station (MTS).

b. (U) Continue P^3I program.

5. (U) Program to Completion:

a. (U) Continue P^3I program to support introduction of new technology and weapons systems.

b. (U) Conduct T&E as required, coincident with new weapon systems.

c. (U) This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRENGCEN, Lakehurst, NJ; NAVAIRTESTCEN, Lexington Park, MD; PACMISTESTCEN, Point Mugu, CA; NAVAVNDEPOT, Jacksonville, FL; NAVAVNDEPOT, Norfolk, VA; NAVWPNSTA, Seal Beach, CA. CONTRACTORS: General Electric Co., Huntsville, AL; Martin Marietta, Americus, GA (Dual Manufacturing Source).

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) Technology Changes: None.

2. (U) Schedule Changes: Due to difficulties in manufacturing to the General Electric Co. design, late delivery of subcontractor equipment delayed the start of Navy testing (TECHEVAL) (Milestone DT-IIC) from January 1990 to 18 April 1990. Consequently, (OPEVAL) (Milestone OT-IIB) is moved to March 1991 and FPO to September 1991.

3. (U) Cost Changes: None.

F. (U) PROGRAM DOCUMENTATION:

	Current	Updated
NDCP	4/86	5/90
TEMP	1/90	-

G. (U) RELATED ACTIVITIES: A Memorandum of Agreement (MOA) was executed between the Naval Air Systems Command (NAVAIR) and the Air Force System Command (AFSC) in which the Navy will provide complete depot level repair for AMRAAM on CASS.

PROGRAM ELEMENT: 0604215N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Support Equipment
PROJECT NUMBER: W0852 PROJECT TITLE: Consolid. Auto. Spt. Sys. (CASS)

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT (AIRCRAFT PROCUREMENT, NAVY)						
Aircraft Spares and Repair Parts						
BA6	0	13,815	18,656	21,708	84,021	138,200
Aircraft Support Equipment and Facilities						
BA7	120,009	123,443	128,725	189,388	1,089,635	1,651,200
(Quantity)	(70)	(55)	(55)	(89)	(506)	(775)
(U) OPERATION AND MAINTENANCE, NAVY						
Central Supply and Maintenance						
BA7	653	862	3,510	9,119	25,166	39,310
Training, Medical and Other General Personnel Activities						
BA8	-	475	475	400	1,809	3,159
(U) MILCON, NAVY						
Project						
P-185	2,200	-	2,400	-	-	4,600

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

J. (U) TEST AND EVALUATION: Phase I of TECHEVAL (DT-IIC1) and the initial Operational Test and Evaluation (OT-IIA) of CASS were concluded during FY 1990. COMOPTEVFOR determined CASS to be potentially operationally effective and potentially operationally suitable, and supported Navy approval for Low Rate Initial Production (Milestone IIIA).

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604215N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Support Equipment
PROJECT NUMBER: W1842 **PROJECT TITLE:** A/C Gas Turbine Facilities

C. (U) **DESCRIPTION:** This project conducts engineering development to support DOD standards for engine test facilities in an attempt to improve engine performance testing by minimizing aerodynamic and thermodynamic effects.

D. (U) **PROGRAM ACCOMPLISHMENTS AND PLANS:**

1. (U) FY 1990 Accomplishments: Not Applicable.
2. (U) FY 1991 Program:
   a. (U) Award contract to develop configuration for turbojet/fan, turboshaft, turboprop test facilities.
   b. (U) Award contract for development of modular aspects of test facilities for configuration management.
   c. (U) Continue design verification.
   d. (U) Verify compatibility test to assure proper mixed gas airflow and enthalpy characteristics.
   e. (U) Continue suitability and performance testing.
   f. (U) Scale model verification and compatibility testing.
   g. (U) Develop engineering database to be utilized for future MILCON.
   h. (U) Develop logistics support.
3. (U) FY 1992 Plans:
   a. (U) Complete design verification
   b. (U) Complete suitability and performance testing.
4. (U) FY 1993 Plans: Not Applicable
5. (U) Program to Completion: Not Applicable

E. (U) **WORK PERFORMED BY:** IN-HOUSE: NAVAIRENGCEN, Lakehurst, NJ; NAVAIR-TESTCEN, Patuxent River, MD; NAVCIVENGLAB, Port Hueneme, CA; NAVOCEANSYSCEN, San Diego, CA.
CONTRACTORS: NONE.

F. (U) **RELATED ACTIVITIES:** This effort is coordinated with similar programs at Air Force Logistics Command.

G. (U) **OTHER APPROPRIATION FUNDS:** (Dollars in Thousands) This is a non-acquisition program.

H. (U) **INTERNATIONAL COOPERATIVE AGREEMENTS:** Not applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604215N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Support Equipment
PROJECT NUMBER: S1857 **PROJECT TITLE:** Calibration Standards

C. (U) **DESCRIPTION:** This project conducts the engineering development of new calibration standards (hardware) required to support/maintain advanced technology weapon systems and associated support equipment.

D. (U) **PROGRAM ACCOMPLISHMENTS AND PLANS:**

1. (U) FY 1990 Accomplishments:
   a. (U) Completed Optical Time Domain Reflectometer.
   b. (U) Continued Navy-wide technology assessment for metrology requirements, funding for Navy requirements at National Bureau of Standards (NBS), and third generation automated pressure calibrator.
   c. (U) Continued effort in Equipment Tolerancing System and Low Level Vibration Measurement System.
2. (U) FY 1991 Program: Complete engineering development and testing of the 30 MHz Attenuation Standard, the Millimeter Wave Power and Attenuation Prototype, the Fiber Optic Calorimeter Standard, the OTDR Calibrator Prototype, the Imaging IR Radiometer Prototype, the IR Diffuse Reflectance Standard, the AC Voltage Calibration System, the Portable Low Level Vibration Calibration System, the ATE Transport Standard, the Equipment Tolerancing System and the Low Level Radiometer Prototype Standard. Begin engineering development of five new standards/systems.
3. (U) FY 1992 Plans: Continue/complete engineering development and testing of twelve standards referenced above. Begin engineering development of five new standards.
4. (U) FY 1993 Plans: Continue/complete engineering development and testing of the items referenced in 3 above. Begin engineering development of three new standards.
5. (U) Program to Completion: This is a continuing program.

E. (U) **WORK PERFORMED BY:** IN-HOUSE: National Institute of Standards and Technology, Washington, DC; NRL, Washington, DC; Navy Metrology Engineering Center, Corona, CA; Navy Primary Standards Laboratory, San Diego, CA.
CONTRACTORS: None.

F. (U) **RELATED ACTIVITIES:** The individual projects in this program are a Navy lead responsibility as part of a coordinated Army and Air Force endorsed effort.

G. (U) **OTHER APPROPRIATION FUNDS:** (Dollars in Thousands) NONE.

H. (U) **INTERNATIONAL COOPERATIVE AGREEMENTS:** NONE.

FY 1992/1993 RDT&E, NAVY DESCRIPTION SUMMARY

PROGRAM ELEMENT: 0604218N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Air/Ocean Equipment Engineering
PROJECT NUMBER: X0532 PROJECT TITLE: Fleet Air Ocean Equipment

A. (U) RESOURCES: (Dollars in thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGR
X0532	FAOE	2,465	2,831	2,806	3,098	Cont.	Cont.

B. (U) DESCRIPTION: This project funds engineering development of sensors and communication interfaces, in addition to processing and display systems to measure, distribute, and display atmospheric/oceanographic parameters for optimum selection and employment of Naval weapon systems.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:

a. (U) Completed Shipboard Meteorological Oceanographic Observation System (SMOOS) Engineering Development Model build and began Technica valuation (TECHEVAL).

b. (U) Planned Automatic Surface Observing System (ASOS) installation engineering and support.

2. (U) FY 1991 PROGRAM: Complete TECHEVAL and achieve Milestone III Approval for Full Production (AFP) of SMOOS; start development of Pre-planned Product Improvement (P3I) for SMOOS sensors and Tactical Environmental Support System (TESS)(3) connectivity; develop TESS(3) interfaces and provide engineering development ashore to distribute data from primary production centers to fleet oceanography centers.

3. (U) FY 1992 PLANS: Continue P3I for SMOOS sensors and TESS(3) connectivity; continue development of Navy unique interfaces for ASOS.

4. (U) FY 1993 PLANS: Continue P3I for SMOOS sensors and TESS(3) connectivity and software development for tactical applications; continue evaluation of Non-Developmental Item alternatives for system upgrades.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN HOUSE: NAVAIRDEVCEN, Warminister, PA; NAVELEXCEN, Vallejo, CA. CONTRACTORS: Lockheed, Austin TX

E. (U) RELATED ACTIVITIES: PE 0603207N, Air/Ocean Tactical Applications; PE 0604230N, Warfare Support Systems

F. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT						
OPN	3,336	9,790	1,380	4,907	Cont.	Cont.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

FY 1992 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604219N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Airborne ASW Development
PROJECT NUMBER: W0485 PROJECT TITLE: CV Helo Avionics Improvement

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0485	CV Helo Avionics	10,079	12,631	25,843	22,976	Cont.	Cont.

B. ( ) DESCRIPTION: This program develops an Airborne Low Frequency Sonar (ALFS) and upgrades sonobuoy processing capability for the SH-60F in order to maintain and improve anti-submarine warfare (ASW) mission effectiveness against the quiet submarine threat. These improvements will be included in the SH-60B Block II Upgrade. An operational requirement for ALFS was established in June 1985. This project provides a dipping sonar that has demonstrated capabilities typically 3 to 6 times (square miles of ocean searched) the existing capability. This improvement will significantly increase aircraft carrier battle group (CVBG) inner zone submarine protection, providing improved CVBG survivability and operating flexibility. For the SH-60B in the middle and outer zones, ALFS improves redetection and localization speed. In addition to long range active sonar search,

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:
   a. (U) Source selection planned and initiated.
   b. (U) Procured UYS-2 (Navy Standard Signal Processor) card sets.
   c. (U) Commenced UYS-2 integration design.

2. (U) FY 1991 PROGRAM:
   a. (U) ALFS contract award (ALFS EDM's)
   b. (U) Commence ALFS hardware and software design.
   c. (U) Procure 2 UYS-2 EDM's.
   d. (U) Plan and award Phase I ALFS aircraft integration contract.
   e. (U) ALFS Preliminary Design Review preparation.
   f. (U) Initiate detailed development test planning.

PROGRAM ELEMENT: 0604219N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Airborne ASW Development
PROJECT NUMBER: W0485 PROJECT TITLE: CV Helo Avionics Improvement

3. (U) FY 1992 PLANS:
   a. (U) ALFS system design and development:
      - Continue ALFS hardware/software design.
      - Conduct ALFS Preliminary Design Review.
      - Conduct ALFS Critical Design Review.
      - Commence hardware/software development.
      - Commence ALFS and UYS-2 integration.
   b. (U) ALFS airframe integration:
      - Award Phase II ALFS airframe integration contract.
      - Continue SH-60F airframe hardware/software modification design.
      - Design and commence modification of Hardware/Software Integration Facility (HSIF).
      - Conduct airframe Preliminary Design Review.

4. (U) FY 1993 PLANS:
   a. (U) ALFS system development:
      - Continue hardware/software development.
      - Continue ALFS/UYS-2 integration.
      - Commence ALFS/UYS-2 system level testing.
   b. (U) ALFS airframe integration:
      - Conduct Critical Design Review.
      - Complete HSIF modifications.
      - Commence airframe hardware/software modifications.
   c. (U) Commence system integration testing.
   d. (U) Commence Contractor and Government development testing.
   e. (U) Commence environmental testing.

5. (U) PROGRAM TO COMPLETION:
   a. (U) This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NATC, Patuxent River, MD; NADC, Warminster, PA; NAC, Indianapolis, IN; NWSC, Crane, IN. CONTRACTORS: TBD for development of sonar. Sikorksy Aircraft Division, Stratford, CT for integration; AT&T, Greensboro, NC for UYS-2.

PROGRAM ELEMENT: 0604219N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Airborne ASW Development
PROJECT NUMBER W0485 PROJECT TITLE: CV Helo Avionics Improvement

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
1. (U) Technology changes: None.
2. (U) Schedule changes: ALFS contract award delayed into 3rd quarter FY 91 to allow proposal and evaluation of alternate processors.
3. (U) Cost changes: None.

F. (U) PROGRAM DOCUMENTATION: OR 6/85, AP 11/89, TEMP - In Draft (estimated completion 2/91).

G. (U) RELATED ACTIVITIES: PE 0604212N, W1707 LAMPS Improvements.
PE 0604507N, Navy Standard Signal Processor

H. (U) OTHER APPROPRIATION FUNDS: (DOLLARS IN THOUSANDS)

(U) PROCUREMENT APPN P-1	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
APN-1 #19/20						

*Production to begin in FY 1996.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE

J. (U) MILESTONE SCHEDULE:

MSII FY 91
MSIII FY 96

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604221N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE. P-3 Modernization Program

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 90 ACTUAL	FY 91 EST	FY 92 EST	FY 93 EST	TO COMPLETE	TOTAL PROG
W1152	P-3 Sensor Integration	2,996	11,508	9,330	8,774	Cont.	Cont.
W1588	P-3 Update IV Avionics	134,088	33,495	31,814	27,676	Cont.	Cont.
W1926	LRAACA	193,835	0	0	0	0	259,532
	TOTAL	330,919	45,003	41,144	36,450	Cont.	Cont.

B. (U) DESCRIPTION: This program provides upgrades to the P-3C's defensive and offensive systems to enhance it's surface and subsurface tracking, classification, and attack capability. The P-3C Sensor Integration (W1152) Project provides improved acoustic software to process more advanced active and passive sonobuoys and increase the operational capability of the P-3C Update III Acoustic System by taking advantage of its software programmability. The P-3 Update IV Avionics (W1588) Project replaces the P-3 mission avionics suite. The suite incorporates new sensors, communicators and a substantial increase in flexibility through a distributed bus architecture that significantly increases processing power while accepting the high data rate sensors. It provides workload sharing among crew stations, allows for ease of incorporating future sensors, and improves aircraft survivability in an increasingly hostile environment through greater standoff targeting and classification ranges. The system improves early alert to a broad range of emerging threat sensors, and significantly increases the acoustic processing capacity of the aircraft by integrating the Enhanced Modular Signal Processor (EMSP) into the data bus system. The testing and key milestones of this project are currently being restructured, within the existing firm fixed price contract with Boeing.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604221N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: P-3 Modernization Program
PROJECT NUMBER: W1152 PROJECT TITLE: P-3C Sensor Integration

C. (U) DESCRIPTION: Primarily a software upgrade, this project will increase the operational capability of the P-3C UPDATE III Acoustic System by integrating the current hardware/ software configuration with advanced sonobuoys and detection algorithms.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

a. (U) Channel Expansion (CHEX) and Air Common Acoustic Processing (ACAP) (release 4.0) OT completed.

2. (U) FY 1991 Program:

a. (U) Post-CHEX and ACAP (release 5.0) DT completed.

b. (U) Post CHEX and ACAP (release 5.0) OT initiated.

3. (U) FY 1992 Plans:

a. (U) Tactical Surveillance Sonobouy (TSS) and ACAP (release 6.0) DT completed.

b. (U) Modify baseline TMS design specification for Tactical Computer to include support for TSS.

4. (U) FY 1993 Plans:

a. (U) Initiate full capability TSS and ACAP 6.0 OT.

b. (U) Generate requirements concept and software specification for the incorporation of Expandable Reliable Acoustic Path Sonobouy (ERAPS), Acoustic Intercept System (AIS), DSS for UPDATE III.

5. (U) Program to Completion:

a. (U) Design and implementation of Acoustic Intercept System (AIS) and ERAPS (ACAP Release 7.0) software in the P-3C UPDATE III acoustic and tactical computers.

b. (U) Develop requirements and specifications for Air Deployable Active Receiver (ADAR) and Enhanced TSS (ETSS).

E. (U) WORK PERFORMED BY: IN-HOUSE: NADC Warminster, PA: NATC, Patuxent River, MD. CONTRACTORS: IBM, Manassas, VA; Computer Sciences Corporation, Warminster, PA; Pacer, Bedford, MA; UNISYS, St. Paul, MN.

F. (U) RELATED ACTIVITIES: PE 0604261N - Acoustic Search Sensors (Air Common Acoustic Processing) developing software and acoustic algorithms.

G. (U) OTHER APPROPRIATION FUNDS: (Dollar in Thousands)

	FY90 ACTUAL	FY91 EST	FY92 EST	FY93 EST	TO COMP	TOTAL PROG
(U) PROCUREMENT APPN/P-1						
APN-5 #50	7,467	19,260	4,440	9,862	40,626	81,655
APN-6 #65						

H. (U) INTERNATIONAL COOPERATION AGREEMENT: NONE.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604221N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: P-3 Modernization Program
PROJECT NUMBER: W1588 PROJECT TITLE: P-3 Update IV Avionics

PICTURE NOT AVAILABLE

POPULAR NAME: UPDATE IV

A. (. SCHEDULE/BUDGET INFORMATION: (DOLLARS IN THOUSANDS)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	TO COMPLETE
Program Milestones					RFT IOC
Engineering Milestones				Del A/C 1/93	
T&E Milestones				DT/OT IIA	
Contract Milestones	WST/IAT Award 5/90				

BUDGET (&K)	FY 1990	FY 1991	FY 1992	FY 1993	TO COMPLETE	PROGRAM TOTAL
Major Contractor	68,073	6,427	2,123	935	4,238	228,274
Support Contract	2,728	1,680	2,155	1,550	2,992	20,146
In-House Support	29,588	16,567	18,936	17,191	26,993	138,138
GFE/TRNR Other	33,699	8,821	8,600	8,000	26,181	150,671
TOTAL	134,088	33,495	31,814	27,676	60,404	537,229

PROGRAM ELEMENT: 0604221N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: P-3 Modernization Program
PROJECT NUMBER: W1588 PROJECT TITLE: P-3 Update IV Avionics

B. (U) DESCRIPTION: This project replaces the mission avionics suite of the P-3 aircraft to provide the required capability necessary to combat nuclear and diesel Soviet and Third World submarines. This capability is obtained by integrating existing and newly developed sensors into a distributed processing system architecture with upgraded displays and controls. The resulting configuration will decrease the existing operator workload and improve operational effectiveness by increasing ease of data handling and reliability. It will also significantly increase the acoustic processing capacity of the aircraft by integrating the AN/UYS-2 Enhanced Modular Signal Processor (EMSP SEM-E), the Navy standard processor, with existing and developmental detection systems, and the non-acoustic processing capacity by integrating the AN/APS-137 Radar, AN/ALR-XX Electronic Support Measures (ESM) system. This project includes first-article training devices for P-3 Update IV avionics, maintenance training, and aircrew Weapons Systems Trainers (WST). The testing and key milestones of the project are currently being restructured.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLAN:

1. (U) FY 1990 Accomplishments:
   a. (U) Continued supporting development of UYS-2 SEM-E.
   b. (U) Continued installation of prototype system aboard flying test bed.
   c. (U) Delivered Patrol Avionics Test Laboratory (PATL) to NATC.
   d. (U) Awarded trainer contract for Update IV Weapon System Trainers (WST) and Integrated Avionics Trainer (IAT)

2. (U) FY 1991 Program:
   a. (U) Complete development of UYS-2 SEM-E.
   b. (U) Certification of Patrol Avionics Test Laboratory (PATL) .

3. (U) FY 1992 Plans:
   a. (U) Digital Processing/Display Generation Unit (DP/DGU) software coding complete.
   b. (U) Continue development of Update IV WST and IAT.
   c. (U) Initiate Navy Independent Verification and Validation (IV&V) Program.

PROGRAM ELEMENT: 0604221N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: P-3 Modernization Program
PROJECT NUMBER: W1588 PROJECT TITLE: P-3 Update IV Avionics

4. (U) FY 1993 Plans:
   a. (U) Preproduction Prototype Aircraft Delivery.
   b. (U) Conduct DT/OT-IIA.
   c. (U) Delivery of Navy Software Avionics Integration Laboratory.
   d. (U) Conduct Milestone IIIB Approval for Full Rate Production (AFRP).
   e. (U) Continue IV&V Program.

5. ( ) Program to Completion:
   a. (U) Conduct Milestone IIIA (ALRIP) and IIIB (AFP).
   b. ( )
   c. ( ) Ready for training
   d. (U) Conduct FOT&E
   e. (U) Conduct DT/OT-IIB, TECHEVAL/OPEVAL
   f. (U) Development and Implement Acoustic Program Enhancement (APE).

D. (U) WORK PERFORMED BY: IN-HOUSE: NADC, Warminster, PA; NATC, Patuxent River, MD. CONTRACTORS: Boeing Aerospace Co., Seattle, WA; Texas Instruments, Inc., Dallas, TX, AT&T Whippany, NJ; CAE, Silver Springs, MD.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) Technical changes: None.

2. (U) Schedule changes: Due to contractor delays the program was formally restructured to revise the testing and milestone schedule.

3. (U) Cost changes: None

F. (U) PROGRAM DOCUMENTATION: TEMP 5/87; AP 6/87; NDCP 7/87; PCAD 12/89.

G. (U) RELATED ACTIVITIES: None.

H. (U) OTHER APPROPRIATION FUNDS: None.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

PROGRAM ELEMENT: 0604221N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: P-3 Modernization Program
PROJECT NUMBER: W1926 PROJECT TITLE: LRAACA

B. (U) DESCRIPTION: The P-7A program will develop a P-3 derivative aircraft for the land based ASW mission to replace the significant number of P-3A and P-3C aircraft which will be retired in the 1990's. This project coincides with an increase in the capability of the Soviet submarine force and the Navy's development of improved tactics and sensors to effectively address this threat. The P-7A will provide greater payload and range/on-station time with fewer personnel and lower operating and support costs (versus existing P-3C capabilities). Specific improvements include incorporation of the P-3 UPDATE IV mission avionics and enhance survivability and self defense.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLAN:

1. (U) FY 1990 Accomplishments:

a. (U) Defined Integrated Electronic Warfare System hardware configuration (LRAACA).

b. (U) Terminated Lockheed P-7A Program (LRAACA)

D. (U) WORK PERFORMED BY: IN-HOUSE: NATC, Patuxent River, MD. and NADC, Warminister, PA. CONTRACTORS: Lockheed Aeronautical Systems Company, Burbank CA.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) Technical changes: Program terminated by FY 1990 end.

2. (U) Schedule changes: Program terminated prior to Milestone IIIA.

3. (U) Cost changes: Program terminated on 20 July 1990. As a result of termination FY-90 authorizaiton was cut $9.35M. All funding has been removed from FY 1991 to Completion.

F. (U) PROGRAM DOCUMENTATION: OR 11/87; DCP 12/88; TEMP 12/88.

G. (U) RELATED ACTIVITIES: P-7A will utilize the mission avionics being developed under PE 0604221N W1588 - UPDATE IV Avionics.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Millions)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
PROCUREMENT	-	0	0	0	0
MILCON	-	0	0	0	0

I. (U) INTERNATIONAL COORPERATIVE AGGREEMENTS:

a. (U) General and Harmonization MOU with Federal Republic of Germany signed 5 April 1989.

J. (U) TEST AND EVALUATION: Not Applicable.

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FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0604230N Budget Activity: 5
Program Element Title: Warfare Support Systems

A. (U) RESOURCES: (Dollars in Thousands)

Project Number	Title	FY 1990 Actual	FY 1991 Estimate	FY 1992 Estimate	FY 1993 Estimate	To Complete	Total Program
X1752	TESS ENG	2,808	2,371	2,521	2,493	Cont.	Cont.
X1779	ROTHR	17,074	11,164	0	0	Cont.	Cont.
X1847	AFLOAT CORR	11,933	0	0	0	0	11,933
X1979	EWCM	192	0	0	0	0	192
TOTAL		32,007	13,535	2,521	2,493	Cont.	Cont.

B. (U) DESCRIPTION: This program element develops shipboard and shore based Tactical Environmental Support Systems (TESS) that predict and assess atmospheric and oceanographic effects on tactical systems.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604230N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Warfare Support Systems
PROJECT NUMBER: X1752 PROJECT TITLE: Tactical Environmental Support System

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGR
X1752	TESS	2,808	2,371	2,521	2,493	Cont.	Cont.

B. (U) DESCRIPTION: This project develops the Navy's computer-based tactical shore and shipboard capability used to predict and assess the impact of the atmospheric and oceanographic environment on the performance of weapon and sensor systems. Data will be ingested from atmospheric and oceanographic satellites, regional oceanographic centers, local observations, and data bases. Through command and control interfaces, the Battle Group commander will merge atmospheric and oceanographic information with other essential intelligence for optimum employment of available platforms, sensors, and weapons.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:
a. (U) Installed Engineering Development Model (EDM) #3 at Naval Eastern Oceanography Center; installed EDM #4 aboard CVN-71; conducted Technical Evaluation and began Operational Evaluation.

2. (U) FY 1991 PROGRAM: Achieve Milestone III Approval for Full Rate Production (AFP); commence Pre-planned Product Improvement (P3I) program for shipboard interfaces.

3. (U) FY 1992 PLANS: Continue development and integration of application software; continue P3I program for shipboard interfaces.

4. (U) FY 1993 PLANS: Continue development and integration of application software; continue P3I program for shipboard interfaces.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NOARL, Monterey, CA; NAVELEXCEN, Vallejo, CA. CONTRACTORS: Lockheed, Austin, TX.

E. (U) RELATED ACTIVITIES: PE 0604218N, Air Ocean Equipment Engrng; PE 0305111N, Weather Service; PE 0603704N, ASW Oceanography.

F. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) OPN	0	24,370	10,997	14,325	78,024	127,716

G. (U) INTERNATIONAL COOPERATIVE AGREEMENT: None.

PROGRAM ELEMENT: 0604230N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Warfare Support System (WSS)
PROJECT NUMBER: X1847 PROJECT TITLE: Afloat Correlation System (ACS)

POPULAR NAME: Afloat Correlation System (ACS)

A. (U) SCHEDULE/BUDGET INFORMATION: (DOLLARS IN THOUSANDS)

SCHEDULE	FY 1990	FY 1991*	TO COMPLETE
Program Milestones	DT-IIIA1 OT-IIIA1		
Engineering Milestones	IOC		
T&E Milestones	DT-IIIA1 OT-IIIA1		
Contract Milestones	Exercise Option		

BUDGET ($K)	FY 1990	FY 1991*	Program Total To Complete
Major Contract	4,084	0	
Support Contract	2,116	0	
In-House Contract	5,617	0	
GFE/ Other	116	0	
Total	11,933	0	

*In FY 91, ACS functionality and funding transferred to P/E 0604231N, Project X0709, Navy Tactical Command System - Afloat (NTCS-A).

PROGRAM ELEMENT: 0604230N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Warfare Support System
PROJECT NUMBER: X1847 PROJECT TITLE: Afloat Correlation System (ACS)

B. (U) DESCRIPTION:

(U) Afloat Correlation System (ACS) provides an automated correlation and information management system capability to integrate multi-source contact and threat warning data and provide a tactical plot. ACS will be an Operational Development Model (ODM) software module designed to execute on standard hardware on Navy Tactical Command System - Afloat (NTCS-A) equipped ships. The ACS ODM is the specific component which will correlate information from both local and remote sensors. ACS provides a fused, dynamic tactical display to NTCS-A and sanitized track updates to the Combat Direction System.

(U) ACS ODM development will be coordinated with NTCS-A, the Electronic Warfare Coordination Module (EWCM) and the Naval Intelligence Processing System (NIPS) programs and use Evolutionary Acquisition (EA). The core portion of this evolutionary development will prototype tactical command and control capabilities while providing limited interim correlator capabilities. This will be accomplished using the desktop computer based Prototype Ocean Surveillance Terminal (POST). In FY 92, POST will be replaced on NTCS-A equipped ships by ACS Phase I, which will field an improved version of the POST correlation algorithm on a NTCS-A compatible workstation. Phase II will field the advanced multi-source, multi-hypothesis correlator/tracker and add interfaces with other shipboard systems. Phase II will add additional computing capability to meet throughput requirements and complete development of tactical analysis and threat warning capabilities. This will complete the currently planned program.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:

a. (U) Completed conversion of baseline correlation software into UNIX "C".

b. (U) Completed developmental testing of baseline correlation software.

c. (U) Initiated developmental and operational testing of the correlation tracker Operational Development Model (ODM).

d. (U) Initiated integration and test of the advanced correlator tracker into the Land Based Test Site (LBTS) system.

e. (U) Initiated design, development, integration and test of command, control and communications tactical decision aids into the software baseline.

FY 1992/93 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604230N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Warfare Support System
PROJECT NUMBER: X1847 PROJECT TITLE: Afloat Correlation System (ACS)

2. (U) FY 1991 PROGRAM:
ACS functionality and funding transferred to NTCS-A.

D. (U) WORK PERFORMED BY: IN HOUSE: NAVOCEANSYSCEN, San Diego, CA;

CONTRACTORS: Science Applications International Corporation (SAIC), McLean, VA.

E. (U) COMPARISON WITH REVISED FY 1991 PRESIDENT'S BUDGET:
1. TECHNOLOGY CHANGES: None.
2. SCHEDULE CHANGES: None.
3. COST CHANGES: None*.

* Funding transferred to P/E 0604231N, Project X0709.

F. (U) PROGRAM DOCUMENTATION:
TEMP 240-2 JUN 1990

G. (U) RELATED ACTIVITIES:
Program Element 0604231N, Tactical Command Systems and Program Element 0205670N, Tactical Intelligence Processing Support

H. (U) OTHER APPROPRIATION FUNDS: None.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

J. (U) TEST AND EVALUATION: Not applicable.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604231N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Tactical Command Systems (TCS)

A. (U) RESOURCES: (Dollars in thousands)

Project Number	Title	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TOTAL PROGRAM
X0486	ASW Operations Center Upgrade	13,386	10,695	11,795	6,254	Cont.
X0709	Navy Tactical Command Systems Afloat 1/	0	9,032	11,473	7,405	Cont.
X1144	NCCS Ashore Nodes	0	1,447	0	0	69,339
X2009	OSIS Baseline Upgrade (OBU)	13,333	13,262	2,383	2,674	Cont.
X2041	Operations Support System (OSS)	7,384	12,003	8,326	9,114	Cont.
	Total	34,103	46,439	33,977	25,447	Cont.

1/ (U) Because of the common interface requirements between the Afloat Correlation System (ACS) and the Electronic Warfare Coordination System Module (EWCM) developments and those of the Tactical Flag Command Center (TFCC), funding has been realigned from PE 0604230N projects X1847 ACS and X1979 EWCM to the Navy Tactical Command System - Afloat Project X0709.

B. (U) DESCRIPTION:

(U) This program develops and upgrades the Navy's command and control information management systems supporting commanders afloat and ashore. Included among these C2 systems are: the unified command centers of CINCPAC and CINCLANT, the Navy Command Center, the Fleet command centers of CINCLANTFLT, CINCPACFLT and CINCUSNAVEUR, the Submarine Operating Authority (SUBOPAUTH) command center, the command centers supporting the Anti Submarine Warfare (ASW) Sector Commander, the Fleet Ocean Surveillance Information Centers (FOSIC) and Fleet Ocean Surveillance Information Facilities (FOSIF), and the Tactical Flag Command Centers (TFCC) afloat. These projects develop information processing and display systems for afloat and ashore commanders providing decision makers the ability to make rapid, informed tactical decisions. TCS develops systems which fuse tactical data between shipboard organic sensors, ashore and space-based non-organic sensors. TCS includes total system definition of each of the major afloat and ashore command centers and the integration of warfare systems within them. The functions provided by TCS are consistent with the Navy's Over-The-Horizon Detection, Classification, and Targeting Architecture.

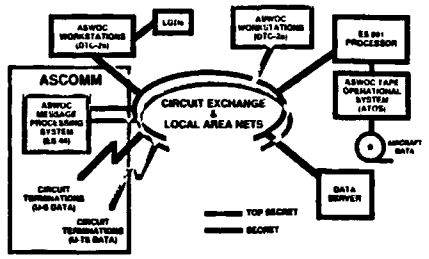
FY 1992/1993 RDT&E NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604231N **BUDGET ACTIVITY:** 5
PROGRAM ELEMENT TITLE: Tactical Command Systems (TCS)

PROJECT NUMBER: X0486 **PROJECT TITLE:** Anti-Submarine Warfare Operations Center (ASWOC) C3 Upgrade

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ASWOC C3 MODERNIZATION
SYSTEM OVERVIEW



A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	TO COMPLETE
Program	SECNAV				
Milestones	REVIEW			MS IIIA	Continuing
Engineering		TEST SYSTEM	TEST SYSTEM		
Milestones		(NESEA,ST. INIGOES)	(ASWOC BRUNSWICK)		Continuing
T&E					
Milestones			DT IIA	OT IIA	Continuing

Contract Various Milestones to support an Evolutionary Acquisition.

Milestones	Integration by NESEA St. Inigoes.				Continuing

BUDGET(SK)	FY 1990	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL (TO COMPLETE)
Major Contracts	8,825	8,856	10,101	5,083	Continuing
Support Contracts	4,064	1,392	1,005	736	Continuing
In-House Support	467	415	655	430	Continuing
GFE/ Other	30	32	34	5	Continuing
TOTAL	13,386	10,695	11,795	6,254	

PROGRAM ELEMENT: 0604231N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Tactical Command Systems (TCS)
PROJECT NUMBER: X0486 PROJECT TITLE: Anti-Submarine Warfare Operations Center (ASWOC) C3 Upgrade

B. (U) DESCRIPTION: The Antisubmarine Warfare Operations Centers (ASWOC) are nodes of the Navy Command and Control System (NCCS) ashore and provide the ASW Commander with the capability to plan and execute his assigned missions. The ASWOC system was established to support the data reduction of the mission tapes generated by the new computerized P-3C aircraft. The ASWOCs currently provide tactical equipment and facilities for mission planning, command and control, post-flight sensor analysis and mission reporting to naval forces afloat. The ASWOC C3 Upgrade will modernize message and data processing capabilities to support simultaneous aircraft missions, improve systems availability, interface with NCCS Ashore theater data bases, improve systems interoperability with U.S. and Allied Naval Operating Forces, and support new aircraft capabilities. This program assures the existing ASWOC baseline system remains interoperable with updated ASW aircraft.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

a. (U) Revised the acquisition strategy for the ASWOC C3 Upgrade. Defined ASWOC Modernization architecture and evolutionary program plan.

b. (U) Continued ASWOC software development supporting new generation ASW aircraft. (e.g., P-3 Update IV and S-3B Update III Channel Expansion (CHEX)).

c. (U) Began development/integration of DTC-2 software to support ASWOC program requirements for MSIIIA.

d. (U) Continued ADP security analysis and integration of security safeguards into the ASWOC architecture.

e. (U) Continued ASWOC transition system development for deployment to ASWOC Keflavik.

2. (U) FY 91 Program:

a. (U) Deliver and test initial ASWOC software supporting P-3 Update IV capabilities at NESEA, St Inigoes. Continue ASWOC software development providing full support of P-3 Update IV and S-3B aircraft.

b. (U) Deliver and test initial mission support aides (computer aided search) at NESEA, St Inigoes.

c. (U) Deliver, test and install software supporting preflight data insertion requirements for P-3C Update III (CHEX) aircraft.

d. (U) Continue development/integration of DTC-2 software to support ASWOC IIIA requirements.

e. (U) Deliver, test and install the ASWOC Message Processing Systems (AMPS).

f. (U) Install and test UYC-8 security filters.

PROGRAM ELEMENT: 0604231N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Tactical Command Systems (TCS)
PROJECT NUMBER: X0486 PROJECT TITLE: Anti-Submarine Warfare Operations Center (ASWOC) C3 Upgrade

g. (U) Complete ASWOC transition system development and deploy to ASWOC Keflavik.

3. (U) FY 92 Plans:

a. (U) Complete development/integration of DTC-2 software to support ASWOC MSIIIA requirements.

b. (U) Complete system performance testing, and initial training in preparation for DT-IIA/OT-IIA.

c. (U) Complete installation of Operational Test Configuration (OTC) at ASWOC Brunswick, Me.

d. (U) Conduct DT-IIA at ASWOC Brunswick.

e. (U) Initiate development and integration of DTC-2 software to support MSIIIB requirements.

f. (U) Develop and integrate software to provide full support the P3C Update IV aircraft.

g. (U) Integrate improved mission support aids (computer aided search) into the C2 subsystem.

h. (U) Deliver and test IUSS interface capabilities at NESEA St Inigoes.

i. (U) Begin TESS interface development and integration.

j. (U) Integrate advanced correlator tracker capabilities into the C2 subsystem.

k. (U) Continue integration and test of fiber optic exchange terminal into ASWOC C2 and communications subsystems.

l. (U) Integrate additional automated message processing capabilities into the ASWOC C3 System.

m. (U) Continue ADP Security analysis and integration of security safeguards in the the ASWOC architecture.

n. (U) Continue independent validation and verification of ASWOC Modernization software.

4. (U) FY 93 Plans:

a. (U) Support OTIIA at ASWOC Brunswick to achieve MSIIIA.

b. (U) Continue development/integration of DTC-2 software to support MSIIIB (FY 95).

c. (U) Continue ASWOC software development and integration providing full support for P3C Update IV and S3B aircraft.

d. (U) Install and test integrated mission support aids (computer aided search). Continue integration of additional capabilities.

e. (U) Continue integrating DTC-2's into the ASWOC architecture. Install and test IUSS interface and test ASWOC/TESS interface.

f. (U) Continue integration of correlator tracker capabilities.

g. (U) Continue integration and test of fiber optic exchange terminal into ASWOC C2 and communications subsystems.

h. (U) Continue integration of automated message processing capabilities improvements into the ASWOC C3 System.

PROGRAM ELEMENT: 0604231N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Tactical Command Systems (TCS)
PROJECT NUMBER: X0486 PROJECT TITLE: Anti-Submarine Warfare Operations Center (ASWOC) C3 Upgrade

i. (U) Continue independent validation and verification of ASWOC Modernization software.

5. (U) Program to Completion: The program will continue to develop and integrate system upgrades; conduct DTIIB; conduct OTIIB to achieve a MSIIB. Upgrades will continue to support new aircraft capabilities and emerging new sensor capabilities. This is a continuing program.

D. (U) WORK PERFORMED BY: IN HOUSE: NAVELEXSYSENGACT St. Inigoes, MD. NAVOCEANSYSCEN San Diego, CA; NAVELEXSYSCEN Vallejo, CA. CONTRACTORS: Potomac Systems Engineering, Inc Annandale, VA; MTM Minnetonka, MN; Planning Systems Inc McLean, VA.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) Technical Changes: None.
2. (U) Schedule Changes: None.
3. (U) Cost Changes: None.

F. (U) PROGRAM DOCUMENTATION:

Operational Requirement #117-094-86	08/86	ASW Master Plan	03/89
Acquisition Plan #90-15	11/90	CRLCMP	08/90
Program Change Approved Document (PCAD)	08/90		
Decision Coordination Paper (DCP)	10/90		
ASWOC Upgrade TEMP #911-2 (Rev 1)	10/90	DRAFT	

G. (U) RELATED ACTIVITIES:

PE 0603708N: ASW Signal Processor: The ASW Signal Processors aboard P-3 and S-3 type aircraft generate acoustic data tapes for analysis by the ASWOC Fast Time Analyzer System (FTAS).

PE 0604217N: S-3 Weapon System Improvement: ASWOC maintains interoperability with S-3 weapon systems and future improvements.

PE 0604219N: Airborne ASW Developments: ASWOC maintains support for new airborne ASW capabilities developed for P-3 and S-3 aircraft.

PE 0604221N: P-3 Modernization: ASWOC maintains interoperability with, and fully supports P-3 system changes and enhancements.

PE 0204311N: Surveillance Direction System: ASWOC maintains interoperability with the Undersea Surveillance System Program and is a subelement of project X0766.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands):

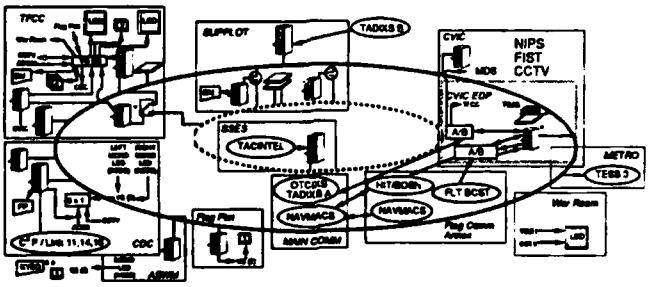
	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
PROCUREMENT						
OPN/#111						
T4371-T4380	6,987	934	10,464	19,375	CONT.	CONT.
OPN#71/WH046	1,646	0	10,782	11,746	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

J. (U) TEST AND EVALUATION: Not applicable to this submission.

FY 1992/93 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604231N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Tactical Command Systems (TCS)
PROJECT NUMBER: X0709 PROJECT TITLE: Navy Tactical Command System Afloat



POPULAR NAME: NAVY TACTICAL COMMAND SYSTEM - AFLOAT (NTCS-A)

A. (U) SCHEDULE/BUDGET INFORMATION: (DOLLARS IN THOUSANDS)

SCHEDULE	FY 1990	FY 1991*	FY 1992	FY 1993	TO COMPLETE
Program Milestones		DT-IIIA2 OT-IIIA2	NPDM DT-IIIB	OT-IIIB	DT/OT-IIIC NPDM
Engineering Milestones		Software Update	Software Update	Software Update	Continue Software Annual Updates
T&E Milestones		DT-IIIA2 OT-IIIA2	DT-IIIB NPDM	OT-IIIB	DT/OT-IIIC NPDM
Contract Milestones		Award New Contract	Exercise Option	Exercise Option	Award New Contracts

BUDGET ($K)	FY 1990	FY 1991	FY 1992	FY 1993	Program Total To Complete
Major Contract		3,028	4,691	3,073	Continuing
Support Contract		675	813	593	Continuing
In-House Contract		5,129	5,744	3,589	Continuing
GFE/ Other		200	225	150	0
Total		9,032	11,473	7,405	Continuing

* FY 90 efforts funded in PE 0604230N Warfare Support Systems, Projects X1847 Afloat Correlation System and X1979 Electronic Warfare Coordination Module.

FY 1992/93 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604231 BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Tactical Command Systems (TCS)
PROJECT NUMBER: X0709 PROJECT TITLE: Navy Tactical Command System - Afloat

B. (U) DESCRIPTION: The Navy Tactical Command System - Afloat (NTCS-A) program consolidates the formerly identified Tactical Flag Command Center (TFCC), Afloat Correlation System (ACS) and Electronic Warfare Coordination Module (EWCM) programs and provides a tactical command, control, communications and intelligence (C3I) system to U.S. Navy ships. This system provides a common C3I baseline for Numbered Fleet Commanders (NFC), Officers in Tactical Command (OTC), Composite Warfare Commanders (CWC), Subordinate Warfare Commanders (SWC), Commander Amphibious Task Force (CATF), Commander Landing Force (CLF) and Commanding Officers/Tactical Action Officers (CO/TAO). This is an Evolutionary Development program which incorporates the operational requirements of TFCC/ACS/EWCM into a single hardware and software baseline. The RDT&E funds in this project provide for the desigr, development, integration and test of: (a) Tactical Decision Aids (TDA) and (b) Tactical Intelligence Analytical Aids, in a multi-level secure mode, to provide the Battle Group/Force Commanders with warfighting Command and Control capabilities. Examples of these developments include:

a. Advanced correlator-tracker which consists of algorithms that evaluate new data with prior data to (1) determine platform and (2) track that platform movements within the tactical envelope;

b. Collection management which collects and files current and historical data relative to tactical targets and uses that data to assist in tracking and determination of capabilities;

c. Counter-targeting/counter-surveillance information on designated targets; and

d. All source (i.e., SCI, GENSER) correlation of tactical targeting data. Improved capabilities are planned for fleet release on an annual basis with the identical computer program being installed on all NTCS-A equipped platforms.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS: (Funded in PE 0604230N, Projects X1979 And X1847 (ACS and EWCM)).

2. (U) FY 1991 PROGRAM: Initiate design, development, integration and test of additional TDA's for counter-targeting/counter-surveillance, communications countermeasures, tactical intelligence analytical tools, multi-level secure network (SCI/GENSER) and collection management; continue development and test of the Advanced Correlator-Tracker, integration and test of C3I TDA's into the software baseline, developmental and operational testing of the annual unitary software release and integration and test of emergent fleet C3I TDA's; and complete integration of current correlator-tracker into the Land Based Test Facility (LBTF), interface with the Naval Warfare Tactical Data Base (NWTDB), transition of TFCC Information Management System (TIMS) into the NTCS-A baseline hardware/software and integration and deployment of the annual unitary software release.

FY 1992/93 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604231N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Tactical Command Systems (TCS)
PROJECT NUMBER: X0709 PROJECT TITLE: Navy Tactical Command System - Afloat

3. (U) FY 1992 PLAN: Initiate development and integration testing of the correlator-tracker upgrades for insertion into the unitary software baseline, developmental testing of the all source (SCI/GENSER) security network and developmental integration and testing of the FY 1993 unitary software release; continue design, development, integration and test of additional TDA's for counter-targeting/counter-surveillance, communications countermeasures, tactical intelligence analytical tools and collection management, development and test of upgrades to the Advanced Correlator-Tracker, integration and test of C3I TDA's into the software baseline, developmental and operational testing of the annual unitary software release and integration and test of emergent fleet C3I TDA's; and complete transition of Prototype Ocean Surveillance Terminal (POST) into the NTCS-A baseline hardware/software and developmental/operational test, integration of current correlator-tracker into the annual unitary software release and integration and deployment of the annual unitary software release.

4. (U) FY 1993 PLANS: Initiate and complete Operational Testing and deployment of the all source (SCI/GENSER) security network, development and integration testing of correlator-tracker upgrades for insertion into the unitary software baseline and developmental integration and testing of the FY 1994 unitary software release; continue design, development, integration and test of additional TDA's for counter-targeting/counter-surveillance, communications countermeasures, tactical intelligence analytical tools and collection management, development and test of upgrades to the Advanced Correlator-Tracker, integration and test of C3I TDA's into the software baseline, developmental and operational testing of the annual unitary software release and integration and test of emergent fleet C3I TDA's; and complete integration of current correlator-tracker into the annual unitary software release and integration and deployment of the annual unitary software release.

5. (U) PROGRAM TO COMPLETION: Continue development and integration testing of correlater-tracker upgrades for insertion into the unitary software baseline, developmental integration and testing of the annual unitary software release, design, development, integration and test of additional TDA's for counter-targeting/counter-surveillance, communications countermeasures, tactical intelligence analytical tools and collection management, development and test of upgrades to the Advanced Correlator-Tracker, integration and test of C3I TDA's into the software baseline and integration and test of emergent fleet C3I TDA's.

D. (U) WORK PERFORMED BY: IN HOUSE: NAVOCEANSYSCEN, San Diego, CA.,COMOPTEVFOR, Norfolk, VA., and NRL, Washington, DC.
CONTRACTORS: INRI, Yorktown, VA., Lockheed, Austin, TX., SAIC, Vienna, VA., and Tiburon Systems, San Jose, CA.

FY 1992/93 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604231N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Tactical Command Systems (TCS)
PROJECT NUMBER: X0709 PROJECT TITLE: Navy Tactical Command System - Afloat

E. (U) COMPARISON WITH REVISED FY 1991 PRESIDENT'S BUDGET:
1. TECHNOLOGY CHANGES: Program has evolved from MIL-SPEC technology to state-of-art Commercial Off The Shelf (COTS)/Non-developmental Item (NDI) technology.

2. SCHEDULE CHANGES: None.
3. COST CHANGES: None.

F. (U) PROGRAM DOCUMENTATION:
TFCC TEMP 240-2 (June 1990) and JOTS TEMP 240-10 (August 1989)

G. (U) RELATED ACTIVITIES:
Program Element 0205670N, Tactical Intelligence Processing Support, Shipboard Tactical Intelligence Processing (STIP).

H. (U) OTHER APPROPRIATION FUNDS: (DOLLARS IN THOUSANDS)

APPN/P-1	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
OPN #89	15,788	26,692	31,613	41,759	61,065	160,368

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: FMS Cases with Australia, Canada and the Netherlands in support of Desert Storm exist.

J. (U) TEST AND EVALUATION: Not Applicable.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604231N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Tactical Command Systems (TCS)
PROJECT NUMBER: X1144 PROJECT TITLE: Navy Command and Control System (NCCS) Ashore Nodes

C. (U) DESCRIPTION: This project incrementally develops and upgrades three components of the NCCS ashore system: The Shore Targeting Terminal (STT) Improvement, the Force High Level Terminal (FHLT) Improvement and Navy Front End Processor (NFEP). The STT and FHLT support the ashore ASW Sector Commanders and Submarine Operating Authorities (SUBOPAUTH) respectively. The NFEP project is the communications processor supporting all NCCS ashore nodes. The upgrades are required to support increased data transmission rates, improved submarine fire control systems, expanded interface requirements, and replacement of antiquated 1960s systems.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:
1. (U) FY 1990 Accomplishments: Not applicable.
2. (U) FY 1991 Program:
a. (U) Code, test and implement NFEP software to provide baseline communications processor for NCCS Ashore programs.
b. (U) R&D task completes in FY 1991.
3. (U) FY 1992 Plans: Not applicable.
4. (U) FY 1993 Plans: Not applicable.
5. Program to completion: Not applicable.

E. (U) WORK PERFORMED BY:
(U) IN HOUSE: NAVOCEANSYSCEN San Diego, CA., NAVELEXSYSENGACT St. Inigoes, MD. CONTRACTORS: Booz, Allen and Hamilton Inc., Bethesda, MD; Scientific Atlanta Corp., Atlanta, GA.

F. (U) RELATED ACTIVITIES: PE 0603763, NCCS Systems Engineering and Integration (SE&I); PE 0604779N, JINTACCS.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

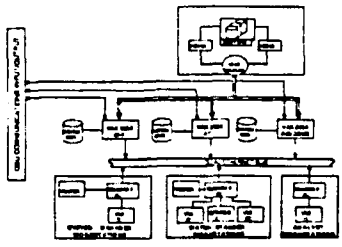
	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	To Complete	Total Program
(U) PROCUREMENT						
OPN #113 T4010	2,210	1,052	0	0	0	4,704

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604231N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Tactical Command Systems (TCS)
PROJECT NUMBER: X2009 PROJECT TITLE: Ocean Surveillance Information System Baseline Upgrade (OBU)

OBU HARDWARE CONFIGURATION



POPULAR NAME: OSIS BASELINE UPGRADE (OBU)

A. (U) SCHEDULE/BUDGET INFORMATION: (DOLLARS IN THOUSANDS)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	PROG TOTAL (TO COMPLETE)
Program Milestones	ARB NPDM	ARB NPDM		ARB NPDM	Continuing
Engineering Milestones		OPEVAL/ Phase II	SDR	SDR	Continuing
T&E Milestones	DT-IIB OT-IIB	DT-IIC OT-IIC	DT-IID	OT-IID	Continuing
Contract Milestones		Phase II Complete Phase III Commence			Continuing

BUDGET($K)	FY 1990	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL
Major Contract	7,630	7,562	-0-	-0-	Continuing
Support Contract	921	450	150	150	Continuing
In-House Support	4,782	5,250	2,233	2,524	Continuing
GFE	-0-	-0-	-0-	-0-	Continuing
Other					
Total	13,333	13,262	2,383	2,674	Continuing

PROGRAM ELEMENT: 0604231N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Tactical Command Systems (TCS)
PROJECT NUMBER: X2009 PROJECT TITLE: Ocean Surveillance Information System Baseline Upgrade (OBU)

B. (U) DESCRIPTION: The Ocean Surveillance Information System (OSIS) Baseline Upgrade (OBU) development is a subsystem of the Navy Command and Control System (NCCS) ashore. OBU provides for the analysis of intelligence information from multiple sources to produce a comprehensive report of foreign forces and potential hostile activity. OSIS provides positional data and operational intelligence to commanders at all levels. It consists of three Fleet Ocean Surveillance Information Centers (FOSICs), two Fleet Ocean Surveillance Information Facilities (FOSIFs), a software support activity, and a training site. OBU functions encompass establishing and maintaining technical characteristics and performance data on hostile weapons platforms systems, collecting non-organic data from ashore and afloat sensors, developing an all-source tactical picture, and analyzing intelligence information. The data derived from this process is disseminated as an OPINTEL product to the operating forces for tactical threat warnings, decision making support, and support of Over-the-Horizon-Targeting.

(U) OBU uses the Joint Logistics Commander's Guidance of March 1987 on Evolutionary Acquisition (EA) as the strategy for future software development. The EA concept includes a plan for incremental achievement of desired capability building on the core system provided by OBU Phases I and II. The OBU Phase III EA strategy will provide a mechanism for adding future capabilities including the incorporation of proven fleet initiated prototypes.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:
   a. (U) Conducted Phase II Operational Test (OT-IIB).
   b. (U) Began workstation upgrades and evaluation of prototype functional enhancements.
   c. (U) Completed Royal Navy installation and accreditation.
   d. (U) Completed ROTHR Interface Module (RIM) FOSIC PAC installation.
   e. (U) Continued software development of OBU Phase II Trusted Port.

2. (U) FY 1991 PROGRAM:
   a. (U) Conduct OPEVAL (OT-IIC).
   b. (U) Complete OT-IIA OPEVAL corrections with OBU Phase II Release 2.0.
   c. (U) Complete software development of OBU Phase II Trusted Port.
   d. (U) Continue workstation upgrades and evaluation of prototype functional enhancements.
   e. (U) Commence Phase III software development.

PROGRAM ELEMENT: 0604231N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Tactical Command Systems (TCS)
PROJECT NUMBER: X2009 **PROJECT TITLE:** Ocean Surveillance Information System Baseline Upgrade (OBU)

C. (U) **PROGRAM ACCOMPLISHMENTS AND PLANS:** (Cont.)

3. (U) **FY 1992 PLANS:**
   a. (U) Begin Mainframe/Disk upgrade and workstation replacement.
   b. (U) Continue evaluation of prototype functional enhancements.
   c. (U) Continue Phase III software development.

4. (U) **FY 1993 PLANS:**
   a. (U) Begin to develop prototypes and update baseline.
   b. (U) Continue evaluation of prototype functional enhancements.

5. (U) **PROGRAM TO COMPLETION:**
   a. (U) This is a continuing program.
   b. (U) Continue evaluation of prototype functional enhancements.

D. (U) **WORK PERFORMED BY:**

IN-HOUSE: NAVOCEANSYSCEN, San Diego, CA;
NAVSWC, Dahlgren, VA
CONTRACTOR: TRW Inc., Merrifield, VA

E. (U) **COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:**

1. (U) Technology Changes: None.

2. (U) Schedule Changes: None.

3. (U) Cost Changes: None.

F. (U) **PROGRAM DOCUMENTATION:**

SOR (No. 35-13)	SEP 76
OBU NDCP	MAY 87
OSIS DCP	JAN 90
OBU Acquisition Plan	JAN 90
OBU TEMP	MAR 90

PROGRAM ELEMENT: 0604231N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Tactical Command Systems (TCS)
PROJECT NUMBER: X2009 PROJECT TITLE: Ocean Surveillance Information System Baseline Upgrade (OBU)

G. (U) RELATED ACTIVITIES:

P.E. 0604230N: Project X1779, Relocatable Over-the-Horizon Radar (ROTHR)

H. (U) OTHER APPROPRIATION FUNDS: (DOLLARS IN THOUSANDS)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT						
OPN BA2 #119 Correlation Upgrade	2,271	3,478	2,524	0	CONT.	CONT.

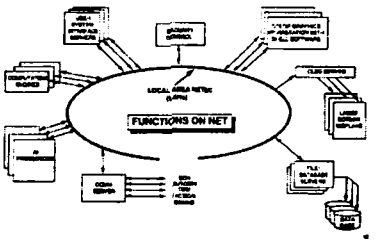
I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: N/A.

J. (U) TEST AND EVALUATION DATA: Not applicable.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604231N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Tactical Command System (TCS)
PROJECT NUMBER: X2041 PROJECT TITLE: Operations Support System (OSS)

OSS INCREMENT II ARCHITECTURE



A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	To Complete
Program Milestones			NPDM 09/92		Continuing
Engineering Milestones			INCR II PDR/CDR	PDR/CDR	Continuing
T&E Milestones	DT	DT II 1A & 2A	DT II 1B & 2B	DT II2C DT	Continuing
CONTRACT Milestones	INCR I Contract Award		INCR II Contract Award		Continuing

BUDGET ($K)	FY 1990	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL
Major Contract	1,050	4,336	5,374	5,053	Continuing
Support Contract	2,171	850	1,000	1,100	Continuing
In-House Support	4,163	6,757	1,892	2,901	Continuing
GFE/ Other	0	60	60	60	Continuing
TOTAL	7,384	12,003	8,326	9,114	Continuing

B. (U) DESCRIPTION: The Chief of Naval Operations (CNO), Fleet Commanders in Chief (CINCs), Unified Commanders (USCINCLANT and USCINCPAC) require a single, integrated command and control system at the Navy Command Center (NCC), Fleet Command Centers (FCC), and the Unified Command Centers, respectively, to receive, process, display and assess the readiness and disposition of own, neutral, and potentially hostile forces. The Operations Support System (OSS) establishes a baseline and incrementally upgrades the information management system to provide modernized access to Worldwide Military Command and Control System (WWMCCS) and improved integrated command decision aids and displays.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604231N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Tactical Command System (TCS)
PROJECT NUMBER: X2041 PROJECT TITLE: Operations Support System (OSS)

(U) The OSS uses the Joint Logistics Commanders Guidance of March 1987 on Evolutionary Acquisition (EA) as the strategy for development. The EA concept includes a plan for incremental achievement of desired capability, early fielding of initial incremental operational capability and continual dialogue and feedback among users, developers, supporters and testers. Increment I provides initial common baseline system by interfacing existing systems such as the Joint Operational Tactical System (JOTS), Fleet Command Center Battle Management Program (FCCBMP), and Operations Support Group Prototype (OSGP). Increment II will develop an integrated, logistically supportable, and cost effective single system, which includes OSIS Baseline Upgrade (OBU) interface, Navy WWMCCS Software Standardization (NWSS) replacement, current system functionality improvement, and multi-level security.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

a. (U) Installed Increment I Phase I briefing and display system.

b. (U) Established system engineering architecture and principles.

c. (U) Developed software interface between Command and Control (C2) workstation and expert systems databases.

d. (U) Established OSS test bed at Naval Ocean Systems Command (NOSC).

e. (U) Conducted OSS Increment II NWSS replacement analysis.

f. (U) Conducted JOTS II software upgrade development for Desk Top Computer II (DTC II).

g. (U) Installed JOTS II configuration at operational sites.

h. (U) Researched and selected a Computer Aided Software Engineering (CASE) tool to be used by all OSS software developers.

i. (U) Conducted developmental testing of first phase of OSS software, and established Navy Software Library for Command, Control and Communications (C3) Systems.

j. (U) Initiated OSS functional description, interface design specification and security analysis document.

k. (U) Transitioned FCCBMP test bed software products.

l. (U) Defined OSS open architecture, prepared OSS Type A Specifications, and completed OSS Acquisition Plan development.

m. (U) Personal Computer Employment Scheduler transitioned from Computer Language (C) to ADA.

2. (U) FY 1991 Program:

a. (U) Continue OSS Increment I baseline development and integration, and complete OSGP Plus software integration.

b. (U) Evaluate parallel processing technology to support CASES.

c. (U) Conduct developmental testing of the Increment I releases.

d. (U) Complete plan for transition of Navy WWMCCS Software Standardization (NWSS) functions into OSS.

e. (U) Design, develop, test and implement software for transitioning the Consolidated History Function.

f. (U) Design, develop, test and integrate Casualty Report (CASREP) functionality.

g. (U) System engineering efforts to provide Remote User Interface.

h. (U) Design, code, test and integrate the Unit Transfer function.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604231N **BUDGET ACTIVITY:** 5
PROGRAM ELEMENT TITLE: Tactical Command System (TCS)
PROJECT NUMBER: X2041 **PROJECT TITLE:** Operations Support System (OSS)

i. (U) Design the Employment Scheduler (EMPSKED) function to replace the NWSS functionality.

j. (U) Design, develop, test and integrate the OSS system administrator functions for message processing.

k. (U) Perform OSS Increment II system definition, design and implementation planning (i.e. data server system).

l. (U) Complete JOTS II software development.

m. (U) Complete source selection for OSS system integrator, workstations/displays, decision aids modeling development and communications.

n. (U) Perform systems engineering efforts to prototype an integrated scheduler involving Force Requirement Expert System Enhancements (FRESH)/PC EMSKED/Fleet Enhancements Scheduling System (FESS).

o. (U) Design and develop the man machine interface for message processing. Implement the OSS query assist language.

3. (U) FY 1992 Plans:

a. (U) Install initial CASES baseline at remaining OSS sites.

b. (U) Continue engineering efforts to perform system definition, design and implementation, including Increment II data server system.

c. (U) Continue to plan for and conduct integrated logistics support and configuration management.

d. (U) Design, develop, test and integrate software for workstation, database, communications, and decision aid functions of Increment II.

e. (U) Install initial serial processor system at CLF/USCINCLANT and CPF/USCINCPAC.

f. (U) Install initial communications server Modernized Navy Front End Processor (MNFEP) at CPF/USCINCPAC, CLF/USCINCLANT, CNE, London and Naples.

g. (U) Upgrade local area networks at all sites to next generation capability (i.e. safenet).

h. (U) Provide System engineering and technical support to user facilities for ADP transition.

i. (U) Conduct development, test and evaluation for completion of Increment I baseline.

j. (U) Conduct operational test and evaluation for completion of Increment I. Implement the CASREP message processing.

k. (U) Develop, test, integrate, and implement the NWSS EMPSKED functionality.

l. (U) Design, develop, integrate and test the Route Generation Land Mass Avoidance function.

m. (U) Design, develop, integrate and test the Movement Report (MOVREP), Military Sealift Command Movement Report (MSCMR), Submarine Notice (SUBNOT) functionality.

n. (U) Design, develop, integrate and transfer the NWSS positional processing functionality.

o. (U) Design the Status of Readiness and Training System (SORTS) function.

p. (U) Implement remote user interface.

q. (U) Conduct Navy Program Decision meeting for Increment II.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604231N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Tactical Command System (TCS)
PROJECT NUMBER: X2041 PROJECT TITLE: Operations Support System (OSS)

4. (U) FY 1993 Plans:

a. (U) Continue systems engineering efforts to perform system definition, design and implementation, including Increment II data server system.

b. (U) Continue to plan for and conduct integrated logistic support and configuration management for OSS.

c. (U) Design, develop, test and integrate software for workstation, database, communications, and decision aid functions.

d. (U) Conduct developmental testing of the Increment II releases.

e. (U) Develop, code, test and integrate the SORTS function.

f. (U) Design, develop, code and test the Naval Control and Protection of Shipping (NCAPS) function.

g. (U) Implement MOVREP, positional processing and route generation.

5. (U) Program to Completion:

a. (U) Complete development of Increment II.

b. (U) Develop Increment III improvements.

c. (U) Conduct Operational Evaluation of full baseline operation capability II.

D. (U) WORK PERFORMED BY:

IN-HOUSE:	NAVOCEANSYSCEN, San Diego, CA
CONTRACTORS:	Pending source selection

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) Technology Changes: None.
2. (U) Schedule Changes: None.
3. (U) Cost Changes: None.

F. (U) PROGRAM DOCUMENTATION:

Operational Requirement	12/87	OSS CRLCMP	2/90
OSS DCP	9/89	OSS PM PLAN	10/89
OSS TEMP	10/89	OSS ILSP	10/89
OSS AP	12/89		

G. (U) RELATED ACTIVITIES:

PE 0604231N: Antisubmarine Warfare Operations Center (ASWOC)
PE 0604321N: Tactical Command System, OSIS Baseline Upgrade (OBU)
PE 0303152N: WWMCCS ADP Modernization (WAM).
PE 0604231N: Force High Level Terminal (FHLT).

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in thousands)

	FY 1990 Actual	FY 1991 Estimate	FY 1992 Estimate	FY 1993 Estimate	To Complete	Total Program
PROCUREMENT						
OPN*	7,850	3,490	4,474	4,508	Cont	Cont

* P-1 line item # to be provided at later date.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

J. (U) TEST AND EVALUATION: Not applicable to this submission.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604233N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: ATA/AX

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W2027	A-12 Development	1,531,287	671,194	0	327,877	Continuing	
W2028	A-12 P3I	7,518	5,950	0	23,363	Continuing	
	TOTAL	1,538,805	677,144	0	351,240	Continuing	

B. (U) DESCRIPTION: This program develops the Navy's next tactical aircraft to fulfill the all weather medium attack mission as a replacement for the aging A-6 INTRUDER. The A-12 FSED contract was terminated for default on 7 January 1991. In terminating the A-12, SECDEF acknowledged the requirement for a replacement for the aging A-6 aircraft. Funding has been budgeted for a follow-on medium attck aircraft replacement under the Aircraft Experimental (AX) program. The program also pursues inter-service avionics commonality for aircraft under development in accordance with Congressional direction.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604233N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: ATA
PROJECT NUMBER: W2027 PROJECT TITLE: A-12/AX Development

PICTURE: Not Available.

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

NOTE: ON 7 JANUARY 1991 SECDEF DIRECTED TERMINATION OF THE A-12 FSED/LOT I CONTRACT FOR DEFAULT. IN TERMINATING THE A-12, SECDEF ACKNOWLEDGED THE REQUIREMENT FOR A REPLACEMENT FOR THE AGING A-6 AIRCRAFT. FUNDING HAS BEEN BUDGETED FOR A FOLLOW-ON MEDIUM ATTACK AIRCRAFT REPLACEMENT UNDER THE AIRCRAFT EXPERIMENTAL (AX) PROGRAM.

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	TO COMPLETE
Program Milestones					
Engineering Milestones					
T & E Milestones					
Contract Milestones					

BUDGET ($K)	FY 1990	FY 1991	FY 1992	FY 1993	Program Total To Complete
Major Contract					
Support Contract					
In-House Contract					
GFE/ Other					
Total	1,531,287	671,194	0	327,877	Continuing

PROGRAM ELEMENT: 0604233N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: ATA
PROJECT NUMBER: W2027 PROJECT TITLE: A-12/AX Development

B. (U) DESCRIPTION: This program develops the Navy's next tactical aircraft to fulfill the all weather medium attack mission as a replacement for the aging A-6 INTRUDER. The A-12 FSED contract was terminated for default on 7 January 1991. In terminating the A-12, SECDEF acknowledged the requirement for a replacement for the aging A-6 aircraft. Funding has been budgeted for a follow-on medium attck aircraft replacement under the Aircraft Experimental (AX) program.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. Continued A-12 FSED including DT-II testing.
   b. Definitized the A-12 Lot I production option.

2. (U) FY 1991 Program:
   a. Conducted Phase III of A-12 Critical Design Review.
   b. Terminated A-12 contract for default.
   c. Initiated program redefinition (i.e., AX program).

3. (U) FY 1992 Program: TBD

4. (U) FY 1993 Program: TBD

5. (U) Program to Completion plans: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRTESTCEN, Patuxent River, MD; NAVWPNCEN, China Lake, CA; NAVAIRDEVCEN, Warminster, PA; NAVPROPTESTCEN, Trenton, NJ; NAVAVIONICCEN, Indianapolis, IN. CONTRACTOR: A-12 - General Dynamics, Ft. Worth, TX and McDonnell Douglas, St. Louis, MO (terminated for default); AX - TBD.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. Technology Changes: TBD.
2. Schedule Changes: TBD.
3. Cost Changes: FY 1991 decreased 8,792 due to Congressional action and 354,747 due to A-12 termination.

F. (U) PROGRAM DOCUMENTATION: A-12 - DCP 4/88; TEMP 2/89; AX - TBD.

G. (U) RELATED ACTIVITIES: Program Element # 0604233N, Project W2028, A-12 P3I.

PROGRAM ELEMENT: 0604233N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: ATA
PROJECT NUMBER: W2027 PROJECT TITLE: A-12 Development

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT						
APN-1/6	1,277,183*					TBD
QTY	0*					
(U) MILCON	15,000					TBD

*Lot I production option terminated

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

J. (U) TEST AND EVALUATION: A-12 - Not applicable due to contract termination; AX - TBD.

PROGRAM ELEMENT: 0604233N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: ATA
PROJECT NUMBER: W2028 PROJECT TITLE: A-12 P3I

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W2028	A-12 P3I	7,518	5,950	0	23,363	Continuing	

B. (U) DESCRIPTION: The DoD Appropriation Act directed the Services to plan for inclusion of common avionics in all aircraft under development. This project funds the development and cost effective application of the fully integrated digital avionics, communications sensors, embedded communication security and other electronics for ATA/AX.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. Awarded Advance Avionics Architecture (A3) contracts.
   b. Supported release of Common Avionics Baseline (CAB) III.

2. (U) FY 1991 Program:
   a. Terminated A3 contracts for convenience.
   b. Review Joint Avionics Integrated Working Group (JIAWG) specifications in light of USAF Advanced Tactical Fighter (ATF) aircraft FSED source selection and USA Light Helicopter (LH) longterm Demonstration/Validation selection.
   c. Develop requirements for advanced integrated electronic warfare systems.
   d. Begin analysis of applicability of JIAWG avionics to AX, when defined.

3. (U) FY 1992 Program: Not Applicable.

4. (U) FY 1993 Program:
   a. Continue detailed engineering analyses of alternative cost effective configurations of JIAWG avionics.

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAVIONICCEN, Indianapolis, IN; NAVAIRDEVCEN, Warminster, PA; NAVWPNCEN, China Lake, CA; NAVAIRTESTCEN, Patuxent River, MD. CONTRACTOR: General Dynamics, Ft. Worth, TX and McDonnell Douglas, St. Louis, MO (terminated for convenience).

PROGRAM ELEMENT: 0604233N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: ATA
PROJECT NUMBER: W2028 PROJECT TITLE: A-12 P3I

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
1. Technical Changes: None.
2. Schedule Changes: None, for JIAWG effort not A-12 specific. TBD for ATA/AX specific efforts.
3. Cost Changes: FY 1991 decreased 1,037 due to Congressional action.

F. (U) PROGRAM DOCUMENTATION: Joint Integrated Avionics Plan (JIAP) March 1989.

G. (U) RELATED ACTIVITIES: Program Element # 0604233N, Project W2027, ATA Development.

H. (U) OTHER APPROPRIATIONS FUNDS: Not Applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

J. (U) MILESTONE SCHEDULE: TBD.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604255N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: ELECTRONIC WARFARE SIMULATOR DEVELOPMENT

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0602	ECHO	19,964	19,620	21,103	22,290	Cont.	Cont.
W0672	ENEWS	8,847	9,525	10,201	10,813	Cont.	Cont.
TOTAL		28,811	29,145	31,304	33,103	Cont.	Cont.

B. (U) DESCRIPTION: This program consolidates the design, fabrication and integration of naval threat radar simulators for increased managerial emphasis and coordination. These simulator development efforts provide realistic developmental and operational test and evaluation of Electronic Warfare (EW) systems in accordance with Service requirements, and General Accounting Office and Congressional recommendations. These developments support flight test and evaluation of airborne EW systems at the Electronic Warfare Threat Environment Simulation (EWTES) complex at the Naval Weapons Center, China Lake, CA and EW systems component test and evaluation at the Electronic Combat Simulation and Evaluation Laboratory (ECSEL) at the Pacific Missile Test Center, Pt. Mugu, CA. The program provides for the continued development of secure, Test & Evaluation (T&E) quality, closed loop radar simulation capabilities for T&E of fully integrated, aircraft installed EW systems at the Naval Air Test Center, Patuxent River, MD. Closed loop simulator development was transferred from W1778 to W0602 in FY 1990. The program also provides for the development of simulation capabilities for Naval air defense, EW testing, and simulations of anti-ship missiles and associated threat launch platforms.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604255N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: ELECTRONIC WARFARE SIMULATOR DEVELOPMENT
PROJECT NUMBER: WO602 PROJECT TITLE: EW ENVIRONMENT SIMULATION

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
WO602	ECHO	19,964	19,620	21,103	22,290	Cont.	Cont.

B. (U) DESCRIPTION: This project provides for the development of an Integrated Naval Air Defense Simulation complex (INADS) for flight test and evaluation of airborne EW equipments and tactics development at the Naval Weapons Center (NWC), China Lake, CA. It also provides for development of laboratory test simulations for EW component test and evaluation at the Pacific Missile Test Center (PMTC), Pt. Mugu, CA. and for continued development of the Closed Loop Test Capability at the Naval Air Test Center (NATC), Patuxent River, MD. This project directly supports High Speed Anti-Radiation Missile (HARM), ALR-67, Advanced Special Receiver (ASR), ALQ-126B, ALQ-165, EA-6B Advanced Capabilities (ADVCAP), Integrated Defensive Avionics Program (IDAP), Advanced Airborne Expendable Decoy (AAED), expendable jammers and decoys as well as other EW systems which will IOC in the 1990s. Navy requirements are coordinated through the Navy Tri-Center (NWC, PMTC, NATC) simulator development concept for mutual support, cost reductions, and increased test effectiveness.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:

a. (U) Continued engineering support of J-7 system simulation development.

b. (U) Continued antenna modifications to Crossbow Generic Radar (CGR) (I-15 upgrade).

c. (U) Continued development of EW/acquisition radar simulation Generic Acquisition Radar (GAR).

d. (U) Continued EW/acquisition radar simulation development at PMTC.

e. (U) Continued EW simulation systems engineering investigations.

f. (U) Continued Background Environment Generator at NATC.

g. (U) Continued Emitter Simulation control system development.

h. (U) Completed Tactical Data System Development for C^2 System #1.

i. (U) Commenced C^3 Environment at NATC.

j. (U) Commenced OSD directed emitter validation/verification program.

2. (U) FY 1991 PROGRAM:

a. (U) Continue antenna modifications to CGR (I-15 upgrade).

b. (U) Continue development of EW/acquisition radar simulation (GAR).

c. (U) Complete EW/acquisition radar simulation development at PMTC.

d. (U) Continue EW simulation systems engineering investigations.

e. (U) Complete Background Environment Generator at NATC.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604255N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: ELECTRONIC WARFARE SIMULATOR DEVELOPMENT
PROJECT NUMBER: WO602 PROJECT TITLE: EW ENVIRONMENT SIMULATION

f. (U) Complete Emitter Simulator control system development.
g. (U) Continue C^3 Environment at NATC.
h. (U) Continue OSD directed emitter validation/verification program.

3. (U) FY 1992 PLANS:
a. (U) Commence development of J-7 simulation (contract award for receiver/transmitter).
b. (U) Continue antenna modifications to CGR (I-15 upgrade).
c. (U) Continue development of EW/acquisition radar simulation (GAR).
d. (U) Continue EW simulation systems engineering investigations.
e. (U) Continue C^3 Environment development at NATC.
f. (U) Continue emitter validation/verification program.
g. (U) Begin development of Universal Core Module for new threat simulators (NWC).

4. (U) FY 1993 PLANS:
a. (U) Continue development of J-7 simulation.
b. (U) Continue antenna modifications to CGR (I-15 upgrade).
c. (U) Complete development of EW/acquisition radar simulation (GAR).
d. (U) Continue EW simulation systems engineering investigations.
e. (U) Continue C^3 Environment development at NATC.
f. (U) Continue OSD directed emitter validation/verification.
g. (U) Commence Universal Core Module for NATC/PMTC.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.
a. (U) Complete development of J-7 simulation (FY96).
b. (U) Complete development of CGR antenna mod (FY94).
c. (U) Continue EW simulation systems engineering investigations.
d. (U) Complete C^3 Environment development at NATC (FY94).
e. (U) Continue OSD directed emitter validation/verification.
f. (U) Continue EO/IR development.
g. (U) Commence Naval AI development.
h. (U) Commence SA-NX-X simulator development.
i. (U) Commence Emitter Simulation development - Enhanced.
j. (U) Commence Millimeter Wave development (PMTC/NWC/NATC).

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVWPNSCEN, China Lake, CA; COMPACMISTESTCEN, Pt. Mugu, CA; and NAVAIRTESTCEN, Patuxent River, MD.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: None.

2. (U) SCHEDULE CHANGES: GAR and I-15 Upgrade schedule slid to accommodate $7.0M congressional reduction in FY91 budget.

3. (U) COST CHANGES: I-15 Upgrade and GAR increased in cost by approximately $3.0M total due to program schedule changes to reflect $7.0M congressional budget reduction for FY91.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604255N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: ELECTRONIC WARFARE SIMULATOR DEVELOPMENT
PROJECT NUMBER: WO602 PROJECT TITLE: EW ENVIRONMENT SIMULATION

F. (U) PROGRAM DOCUMENTATION: NAPDD 052-098 - 1 APR 86.

G. (U) RELATED ACTIVITIES: Navy requirements coordinated under the Test and Training Resources Policy Board, established in FY88 to prioritize requirements and prevent unnecessary duplication. Navy efforts are coordinated with Army and Air Force requirements through the OSD Joint Executive Committee on Air Defense Threat Simulations (EXCOM), the OSD CROSSBOW-S Committee, and the Joint Coordinating Committee on Electronic Defense Systems. Army simulation efforts are funded under PE 0605603A; USAF PEs 0604735F/0604270F and OPAF PEs 0101897F/ 0207429F; CROSSBOW-S PE 0605134D/804D.

H. (U) OTHER APPROPRIATION FUNDS: None.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

J. (U) MILESTONE SCHEDULE: Completions.

1.	(U) Background Emitter Generator	4Q/FY91
2.	(U) Emitter Simulator control system	4Q/FY91
3.	(U) EW/acquisition radar simulation	2Q/FY94
4.	(U) CGR antenna upgrade	4Q/FY94
5.	(U) J-7 RX/TX (NWC)	4Q/FY95

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604255N BUDGET ACTIVITY 6
PROGRAM ELEMENT TITLE: ELECTRONIC WARFARE SIMULATOR DEVELOPMENT
PROJECT NUMBER: W0672 PROJECT TITLE: EFFECTIVENESS OF NAVY ELECTRONIC WARFARE SYSTEMS (ENEWS)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0672	ENEWS	8,847	9,525	10,201	10,813	Cont.	Cont.

B. (U) DESCRIPTION: Provides realistic developmental and operational test and evaluation of shipboard Electronic Warfare (EW) systems in accordance with operational requirements. The ENEWS program provides computer facilities, hybrid laboratory simulation, and flyable simulators at the Naval Research Laboratory, Washington, DC. Simulation capabilities are used to aid in the development of anti-ship missile defense, support EW testing, and provide realistic simulations of Soviet and third world anti-ship missiles and associated threat launch platforms.

C. ( ) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. ( ) FY 1990 ACCOMPLISHMENTS:
   a. (U) Continued upgrade of ENEWS reference library.
   b. (U) Continued digital modeling/scenario development.
   c. ( ) Continued Initial AN/ALQ-170 Simulator development.
   d. ( ) Continued upgrades to _imulator.
   e. ( ) Continued development
   f. ( ) Initiated simulator.
   g. ( ) Initiated simulator development.
   h. ( ) Initiated simulator development.
   i. ( ) Completed
   j. ( ) Completed simulator flight check.

2. ( ) FY 1991 PROGRAM:
   a. (U) Continue upgrade of ENEWS reference library.
   b. (U) Continue Digital modeling/scenario development.
   c. ( ) Continue Initial AN/ALQ-170 simulator development.
   d. ( ) Continue development development.
   e. (Continue simulator development.
   f. ( ) Continue simulator development.
   g. (Continue simulator development.
   h. ( ) Initiate development.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604255N BUDGET ACTIVITY 6
PROGRAM ELEMENT TITLE: ELECTRONIC WARFARE SIMULATOR DEVELOPMENT
PROJECT NUMBER: W0672 PROJECT TITLE: EFFECTIVENESS OF NAVY ELECTRONIC WARFARE SYSTEMS (ENEWS)

3. ( ) FY 1992 PLANS:
   a. (U) Continue upgrade of ENEWS reference library.
   b. (U) Continue digital modeling/scenario development.
   c. ( ) Continue development.
   d. ( ) Continue simulator development.
   e. ( ) Continue simulator development.
   f. ( ) Continue simulator development.
   g. ( ) Continue development.
   h. ( ) Initiate instrumentation of
   i. ( ) Complete Initial AN/ALQ-170 capability.
   j. ( ) Complete simulator upgrade.

4. ( ) FY 1993 PLANS:
   a. (U) Continue upgrade of ENEWS reference library.
   b. (U) Continue digital modeling/scenario development.
   c. ( ) Continue development.
   d. (Continue simulator development.
   e. ( ) Continue simulator development.
   f. ( ) Continue simulator development.
   g. ( ) Continue development.
   h. ( ) Complete initial AN/ALQ-170 capability.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: Naval Research Laboratory, Washington, DC.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
   1. (U) TECHNOLOGY CHANGES: None.
   2. (U) SCHEDULE CHANGES: RF simulation development terminated.
   3. (U) COST CHANGES: Funding was reduced by $3,448 in FY 1991 by Congressional action.

F. (U) PROGRAM DOCUMENTATION: NAPDD 049-09 - Jan 88

G. (U) RELATED ACTIVITIES: None.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands) None.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604255N BUDGET ACTIVITY 6
PROGRAM ELEMENT TITLE: ELECTRONIC WARFARE SIMULATOR DEVELOPMENT
PROJECT NUMBER: W0672 PROJECT TITLE: EFFECTIVENESS OF NAVY ELECTRONIC WARFARE SYSTEMS (ENEWS)

J. ( ) MILESTONE SCHEDULE: IOC

1. (U) RF Simulators
   a. ( )
   b. ( )
   c. ( )
   d. ( )

2. (U) IR Simulators
   a. ( )
   b. ( )
   c. ( )
   d. ( )

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0604258N Budget Activity: 6
Program Element Title: TARGET SYSTEMS DEVELOPMENT

A. (U) RESOURCES: (Dollars in Thousands)

Project Number	Title	FY 1990 Actual	FY 1991 Estimate	FY 1992 Estimate	FY 1993 Estimate	TO COMPLETION	Total Program
W0609	Aerial Target Systems Dev.	8,175	7,565	11,786	16,282	Cont.	Cont.
W0610	Weapons Sys T&E Targets Dev. & Proc.	15,550	4,652	13,184	13,956	Cont.	Cont.
W0611	Supersonic Low Altitude Target	26,078	39,555	72,981	71,087	22,600	421,159
S0612	Seaborne Target Development	980	1,069	1,586	1,733	Cont.	Cont.
TOTAL		50,783	52,841	99,537	103,058	Cont.	Cont.

B. (U) BRIEF DESCRIPTION OF ELEMENT: This element develops and procures Aerial and Surface Targets and associated augmentation and auxiliary systems necessary to duplicate or simulate threat characteristics in support of weapons systems performance test and evaluation and Fleet training. Included within this Program Element are QF-4S development, BQM-74 upgrade, (W0609); procurement of AQM-37C, MQM-8, QF-4, and BQM-34, targets for Navy weapons systems test and evaluation (W0610); development and limited procurement of the AQM-127 SLAT (W0611); and continued development of surface towed targets, improved target control system and an anti-radiation missile target (S0612).

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0604258N Budget Activity: 6
Program Element Title: TARGET SYSTEMS DEVELOPMENT
Project Number: W0609 Project Title: AERIAL TARGET SYSTEMS DEV.

A. (U) RESOURCES: (Dollars in Thousands)

Project Number	Title	FY 1990 Actual	FY 1991 Estimate	FY 1992 Estimate	FY 1993 Estimate	To Complete	Total Program
W0609	Aerial Target Systems Dev.	8,175	7,565	11,786	16,282	Cont.	Cont.

B. (U) PROJECT DESCRIPTION: Aerial Target Systems and associated augmentation and auxiliary systems are developed in response to the need to test and provide training for anti-air-warfare (AAW) and anti-surface-warfare (ASW) systems required to defend Fleet Surface and air units in a hostile environment. The threat envelope covered extends from the surface to 100K feet for speeds in the low subsonic range to MACH 4.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS

1. (U) FY 1990 Accomplishments:
   a. (U) Continued BQM-74C upgrade to BQM-74E.
   b. (U) Continued QF-4S Full Scale Engineering Development(FSED).
   c. (U) Continued development of ULQ-21 Electronic Counter Measure (ECM) modules/Electronic Counter Measure(ECM) decoys.
   d. (U) Completed testing of USQ-104 Scorer.
   e. (U) Developed A-6 Systems Weapon Integration Program(SWIP) Engineering Change Proposal to allow dual target tow reel capability.
2. (U) FY 1991 Program
   a. (U) Continue FSED on QF-4S.
   b. (U) Initiate development of advanced command/control transponder.
   c. (U) Continue development of ULQ-21 ECM modules/ECM decoys.
   d. (U) Complete BQM-74C upgrade to BQM-74E.
   e. (U) Continue A-6/Tows integration.
3. (U) FY 1992 Plans:
   a. (U) Complete A-6/Tows integration.
   b. (U) Continue QF-4S FSED.
   c. (U) Continue development of advanced command/control transponder.
   d. (U) Continue development on ULQ-21/decoy ECM module.
   f. (U) Initiate development of Vector Scorer.
4. (U) FY 1993 Plans:
   a. (U) Initiate development of AQM-37C booster.
   b. (U) Initiate development of F-14/AQM-37 integration.
   c. (U) Continue QF-4S FSED.
   d. (U) Continue advanced command/control transponder development.
   e. (U) Continue development of ULQ-21/decoy ECM modules.
   f. (U) Initiate development of BQM-(PI).
5. (U) Program to Completion: This is a continuing program.

Program Element: 0604258N Budget Activity: 6
Program Element Title: TARGET SYSTEMS DEVELOPMENT
Project Number: W0609 Project Title: AERIAL TARGET SYSTEMS DEV.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVWPNCEN, China Lake, CA; NAVAIRDEVCEN, Warminster, PA; PACMISTESTCEN, Point Mugu, CA; NAVAVNDEPOT, Cherry Point, NC and NAVAVNDEPOT North Island, CA. CONTRACTORS: Beech Aircraft, Wichita, KS; Northrop, Ventura, CA; Motorola, Scotsdale, AZ; Southwest Aerospace, Santa Ana, CA; Marquardt, Van Nuys, CA.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not Applicable.
2. (U) Schedule Changes: Not Applicable.
3. (U) Cost Changes: Not Applicable.

F. (U) PROGRAM DOCUMENTATION:

OF-4S	TOR 6/85
	OR 12/86

G. (U) RELATED ACTIVITIES:

o Test and evaluation of current in-service weapons systems: AIM-7/F, AIM-9H/L/M, AEGIS, AIM-54A, Basic Point Defense, TARTAR, TERRIER, Standard Missile 1, and Close-in Weapons System.

o Systems currently in test and evaluation: AIM-7M, AIM-54C, AMRAAM, Standard Missile II, Rolling Airframe Missile, SEASPARROW, and AEGIS.

o Weapons systems to enter test and evaluation: 5" guided projectile, high energy laser DDG-51.

o Fleet weapons training with air-to-air, surface-to-air, air-to-surface and surface-to-surface weapons.

There is no duplication of effort between this project and others within the Navy or DOD.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

APPN/P-1	FY 1990 Actual	FY 1991 Estimate	FY 1992 Estimate	FY 1993 Estimate	Total Program
WPN # 27	124,424	149,410	172,828	371,515	Cont

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable

Program Element: 0604258N Budget Activity: 6
Program Element Title: TARGET SYSTEMS DEVELOPMENT
Project Number: W0609 Project Title: AERIAL TARGET SYSTEMS DEV.

J. (U) MILESTONE SCHEDULE:

	I	II	III	IOC
BQM-74 E	N/A	FY89/4Q	FY91/2Q	FY93/2Q
QF-4S	N/A	FY89/2Q	FY94/4Q	FY95/1Q
USQ-104	N/A	FY86/4Q	FY91/3Q	FY92/1Q
CONTROL TRANSPONDER	N/A	FY91/3Q	FY94/3Q	FY96/1Q
F-14/AQM-37 INTEG	N/A	FY93/4Q	FY96/3Q	FY97/3Q
AQM-37 BOOSTER	N/A	FY93/4Q	FY96/4Q	FY97/3Q
BQM-PI	N/A	FY93/4Q	FY96/4Q	FY97/4Q
VECTOR SCORER	N/A	FY92/2Q	FY95/2Q	FY97/2Q

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0604258N Budget Activity: 6
Program Element Title: TARGET SYSTEMS DEVELOPMENT
Project Number: W0610 Project Title: WPN SYSTEM T&E TARGETS DEV/PROC.

A. (U) RESOURCES: (Dollars in Thousands)

Project Number	Title	FY 1990 Actual	FY 1991 Estimate	FY 1992 Estimate	FY 1993 Estimate	To Completion	Total Program
W0610	Weapons Sys T&E Targets	15,550	4,652	13,184	13,956	Cont.	Cont.

B. (U) DESCRIPTION OF PROJECT: Test and evaluation of Naval Weapons Systems requires targets which closely replicate current and projected threats to Fleet units in the AAW and anti-surface warfare (ASUW) environments. This replication must include characteristics related to size, performance envelope, and electromagnetic and infrared signatures. As threats change, changes must be made to keep the targets as threat representative as possible. This is done in response to changes in the requirements of the developers of naval weapons systems.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. (U) Completed conversion of 4 aircraft into QF-4N targets.
   b. (U) Continued BQM-34S procurement (final increment).
   c. (U) Continued procurement (2nd increment) 20 MQM-8G VANDALs.
   d. (U) Initiated procurement of 8 Firing Error Indicators (FEI) scorers.

2. (U) FY 1991 Program:
   a. (U) Complete procurement (second increment) of 8 (FEI) scorers.
   b. (U) Procure 75 DSQ-37 scorers.

3. (U) FY 1992 Plans:
   a. (U) Convert 5 F-4N aircraft into QF-4N targets.

4. (U) FY 1993 Plans:
   a. (U) Convert 5 F-4N aircraft into QF-4N targets.
   b. (U) Procure 6 firing error indicator (FEI) scorers.

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRDEVCEN, Warminster, PA; NAVWPNCEN, China Lake, CA; NAVAVNDEPOT, Cherry Point, NC and NAVAVNDEPOT North Island, San Diego, CA CONTRACTORS: Allied Bendix, Mishawaka, IN; Teledyne Ryan Aeronautical, San Diego, CA.; Southwest Aerospace, Santa Ana, CA

Program Element: 0604258N Budget Activity: 6
Program Element Title: TARGET SYSTEMS DEVELOPMENT
Project Number: W0610 Project Title: WPN SYSTEM T&E TARGETS DEV/PROC.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not Applicable.

2. (U) Schedule Changes: Not Applicable.

3. (U) Cost Changes: Not Applicable.

F. (U) PROGRAM DOCUMENTATION:

QF-4N TEMP (#1172) 9/85
QF-4S TEMP (#1172-01) 3/89

G. (U) RELATED ACTIVITIES:

o Test and Evaluation of current in-service weapons: AIM-7E/F, AIM-9H/L/M, AEGIS, AIM-54A, Basic Point Defense, TARTAR, TERRIER, Standard 1, and Close-in Weapon System.

o Systems currently in test and evaluation: AIM-7M, AIM-54C, AMRAAM, Standard Missile II, Rolling Airframe Missile, SEASPARROW, and AEGIS.

o Weapons systems to enter test and evaluation: 5" guided projectile, high energy laser.

There is no duplication of effort between this project and others within the Navy or DOD.

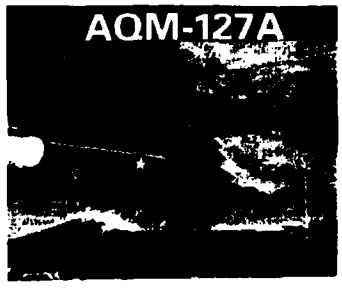
H. (U) OTHER APPROPRIATION FUNDS: This is not an acquisition program.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable

J. (U) MILESTONE SCHEDULE: Not Applicable

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0604258N **Budget Activity:** 6
Program Element Title: TARGET SYSTEMS DEVELOPMENT
Project Number: WQ611 **Project Title:** SUPERSONIC LOW ALTITUDE TARGET (SLAT)



POPULAR NAME: SLAT

A. (U) SCHEDULE/BUDGET INFORMATION:

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	To Complete
Program Milestones	LRG 6/91	MS-IIC 9/91	MS-III 1/93	IOC T&E 1/94	IOC FLEET 10/94
Engineering Milestones	CDR G&C MOD 4/90			PCA 10/93	PCA COMPLETE 3/94
T&E Milestones	DT-II B/C 11/90-7/91 DT-IID 6/91	OT-II 4/92-9/92 DT-IID 1/92			
Contract Milestones		T&E PROCUREMENT (30 QTY) 12/91			

BUDGET ($K)	FY 1990	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL/ TO COMPLETE
Major Contract	18,693	20,417	60,291	64,011	333,425 22,213
Support Contract	555	999	670	469	3,984 264
In-House Support	6,830	18,139	12,020	6,608	83,840 4,256
GFE/ Other					
TOTAL	26,078	39,555	72,981	71,087	421,249 22,600

Program Element: 0604258N Budget Activity: 6
Program Element Title: TARGET SYSTEMS DEVELOPMENT
Project Number: W0611: Project Title: SUPERSONIC LOW ALTITUDE TARGET (SLAT)

B. (U) PROJECT DESCRIPTION: This project provides for the development and procurement of a low altitude supersonic target which stimulates the anti-ship cruise missile threat. The target weighs 2,500 pounds and is capable of flying at a minimum altitude of less than 30 feet at 2.5 MACH. It is air launched at subsonic speeds and has a 55 nautical mile range until fuel burnout.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. (U) Completed Guidance and Control changes.
   b. (U) Commenced qualification of modified Inertial Measurement Unit (IMU).
   c. (U) Validated and verified software modifications.
   d. (U) Updated range integration documentation.
   e. (U) Commenced captive carry range integration flights.
   f. (U) Initiated planning for interim site activation at Atlantic Fleet Weapons Training Facility (AFTWF), Roosevelt Roads, PR.
2. (U) FY 1991 Program:
   a. (U) Complete Contractor Test and Evaluation/Navy Test and Evaluation(CTE/NTE)
   b. (U) Commence TECHEVAL (eight flights) at PMTC and AFTWF.
3. (U) FY 1992 Plans:
   a. (U) Complete TECHEVAL.
   b. (U) Procure 30 T&E targets after M/S IIC.
   c. (U) Conduct OPEVAL (ten flights).
   d. (U) Procure technical data package.
4. (U) FY 1993 Plans:
   a. (U) Conduct MS-III review and award first production lot contract.
   b. (U) Commence physical configuration audit (PCA).
   c. (U) Complete FSED and commence limited operations at PMTC.
5. (U) Program to Completion:
   a. (U) RDT&E SLAT program completed in 1994.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVWPNCEN, China Lake, CA; NAVAIRDEVCEN, Warminster, PA; PACMISTESTCEN, Point Mugu, CA; NOS IH, Indian Head, MD; NWSC, Dahlgren, VA; NAVAIRTESTCEN, Patuxent River, MD; NAVAIRENGCEN Lakehurst NJ. CONTRACTOR: Martin Marrietta, Orlando, FL.

E. (U) COMPARISON WITH FY 1991 PRESIDENTS BUDGET:
1. (U) Technology Changes: Not Applicable.
2. (U) Schedule Changes: Not Applicable.
3. (U) Cost Changes: Not Applicable.

Program Element: 0604258N Budget Activity: 6
Program Element Title: TARGET SYSTEMS DEVELOPMENT
Project Number: W0611: Project Title: SUPERSONIC LOW ALTITUDE TARGET (SLAT)

F. (U) PROGRAM DOCUMENTATION:

NDCP	8/84
Revised TEMP (Proj Approval)	2/91
Revised Acquisition Plan (Proj Approval)	1/91
Revised DCP (Proj Approval)	2/91

G. (U) RELATED ACTIVITIES:

o Systems currently in test and evaluation: AEGIS, Standard Missile II, New Threat Upgrade CIWS.

o Proposed systems: Arleigh Burke (DDG-51), Standard Missile II Block Upgrades.

There is no duplication of effort between this project and others within the Navy or DOD.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION DATA: Not Applicable.

UNCLASSIFIED

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0604258N BUDGET ACTIVITY: 6
Program Element Title: TARGET SYSTEMS DEVELOPMENT
Project Number: S0612 Project Title: SEABORNE TARGET DEVELOPMENT

C. (U) DESCRIPTION: This project develops required seaborne target systems and their related target augmentation systems in support of air-to-surface and surface-to-surface weapons test and evaluation and fleet training.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:
1. (U) FY 1990 ACCOMPLISHMENTS:
a. (U) Continued Seaborne Powered Targets (SEPTAR) Improved Control System development.
b. (U) Continued Command and Control Augmentation development.
c. (U) Commenced Ship Simulator Platform (SSP).
d. (U) Continued Anti-Radiation Missile Emitter (ARME) development.
e. (U) Completed Ship Target Radar Simulator (STRS) documentation revision.
2. (U) FY 1991 PROGRAM:
a. (U) Complete SEPTAR Improved Control System.
b. (U) Continue Command and Control Augmentation Development.
c. (U) Continue Ship Simulator Platform. (obtain test bed)
d. (U) Commence Weapons Systems/Emitter Interface.
e. (U) Continue ARME.
f. (U) Continue STRS.
3. (U) FY 1992 PLANS:
a. (U) Continue Command and Control Augmentation development.
b. (U) Continue Ship Simulator Platform. (test bed alternatives)
c. (U) Continue Weapons System/Emitter Interface.
d. (U) Complete ARME.
e. (U) Continue STRS.
4. (U) FY 1993 PLANS:
a. (U) Continue Command and Control Augmentation development.
b. (U) Continue Ship Simulator Platform (configuration selection).
c. (U) Continue Weapons System/Emitter Interface.
d. (U) Continue STRS.
e. (U) Commence Multi-Spectrum Augmentation.
5. (U) PROGRAM TO COMPLETION: This is a continuing effort.

E. (U) WORK PERFORMED BY: IN-HOUSE: PACMISTESTCEN, Pt. Mugu, CA.

F. (U) RELATED ACTIVITIES: Not Applicable.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) OPN/line 227	3,713	4,909	5,249	8,475	Cont.	Cont.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604260N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: CH//MH-53E
PROJECT NUMBER: W1109 PROJECT TITLE: CH//MH-53E

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W1109	CH/MH-53	5,059	19,794	9,305	13,120	Cont.	Cont.

B. (U) DESCRIPTION: This project provides for the development of an upgrade to the H-53E's T64-GE-416 engine. The recoverability of the aircraft with a single engine failure under tow was the top unsuitability deficiency cited in the MH-53E OPEVAL report. This project provides for the development of an improved Main Gearbox (MGB) for the H-53E. Improvements to the Main Gearbox include enhanced reliability and maintainability (increase time between scheduled removal from 1,250 hours to 2,050 hours). This project also provided for the development required to integrate a Global Positioning System (GPS) into the MH-53E. This project provided for an infrared Helicopter Night Vision System (HNVS). The present USMC/NAVY helicopter ability to perform amphibious warfare and tactical minesweeping operations is severely restricted by the lack of a night/low visibility capability. This project will allow transport and minesweeping helicopters to operate at low altitude and at near daylight airspeeds at night and during periods of reduced visibility. Additionally, this project provides funding for development of a Composite Main Rotor Blade (CMRB).

C. (U) Program Accomplishments and Plans:
1. (U) FY 1990 Accomplishments:
   a. (U) Commenced HNVS TECHEVAL.
   b. (U) Continued development and ground testing of upgraded engine.
   c. (U) Award of GPS Integration contract.
   d. (U) Main Gearbox contract awarded.
2. (U) FY 1991 Programs:
   a. (U) Continue GPS integration effort.
   b. (U) Main Gearbox prototype design.
3. (U) FY 1992 Plans:
   a. (U) Commence HNVS OPEVAL.
   b. (U) Development and kit fabrication/installation of GPS into CH-53E/MH-53E.

PROGRAM ELEMENT: 0604260N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: CH/MH-53E
PROJECT NUMBER: W1109 PROJECT TITLE: CH/MH-53E

4. (U) FY 1993 Plans:
   a. (U) Complete GPS installation.
   b. (U) Commence GPS OPEVAL.
   c. (U) Fabrication of the main gear box prototype.
   d. (U) Testing of the main gear box prototype.
   e. (U) CMRB development contract award.

5. (U) Program to Completion: This is a continuing program.

D. (U) Work Performed BY: IN-HOUSE: NAVAIONICCEN Indianapolis, IN; NAVAIRTESTCEN Patuxent River, MD CONTRACTOR: Sikorsky Aircraft, Stratford, CT; General Electric Corp., Lynn, MA. Engineering and Economic Research (EER), Inc. Vienna, VA.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
1. (U) TECHNOLOGY CHANGES: none
2. (U) SCHEDULE CHANGES: Scheduled Operational Evaluation of the Helicopter Night Vision System slipped from FY1990 to FY 1992.
3. (U) COST CHANGES: none

F. (U) PROGRAM DOCUMENTATION:
1. (U) GPS: DCP No. 133 Rev B 5/79: TEMP 9/87
2. (U) HNVS: OR 0930AW 4/77; TEMP approved 11/85, revised 8/88
3. (U) Engine/MGB: NPDM 11/86

G. (U) RELATED ACTIVITIES: Program Element 0604777N Global Positioning System (GPS).

H. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

J. (U) MILESTONE SCHEDULE:
1. (U) HNVS: Commence TECHEVAL 9/89.
2. (U) GPS: Award integration contract 6/90; Commence TECHEVAL 4/92; OPEVAL 9/92; FRP 3/93.
3. (U) Engine/MGB: Award engine airframe integration contract (SIKORSKY) 6/91, Flight Test 6/93; Main Gearbox reliability improvement contract award 8/90.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604261N BUDGET ACTIVITY: 4-Tactical Programs
PROGRAM ELEMENT TITLE: Acoustic Search Sensors (Engineering)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0478	Expendable, Reliable Acoustic Path Sonobuoy	6,432	6,845	5,231	872	106	19,483
W0480	ASW Sensors and Processing	3,577	1,594	14,837	17,519	CONT.	CONT.
W2000	Air Deployable Active Receiver	0	11,623	10,032	13,728	CONT.	CONT.
W2001	Tactical Surveillance Sonobuoy	18,738	15,275	20,961	16,107	CONT.	CONT.
	TOTAL	28,747	35,337	51,061	48,226	CONT.	CONT.

B. ( ) DESCRIPTION: This program provides for the engineering development tic search sensors to: (1) ensure a submarine prosecution capability is maintained against the mid-1990/2005 threats including third world diesels;(2) (2) develop those sensors identified in the Navy's ASW Master Plan; (3) develop and exploit) develop advanced aircraft avionics and software to process sensors under development.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604261N BUDGET ACTIVITY: 4-Tactical Programs
PROGRAM ELEMENT TITLE: Acoustic Search Sensors (Engineering)
PROJECT NUMBER: W0478 PROJECT TITLE: Expendable Reliable Acoustic Path Sonobuoy (ERAPS)

C. ( ) DESCRIPTION: The Expendable Reliable Acoustic Path Sonobuoy (ERAPS), AN/SSQ-75 Sonobuoy, is an active localization sensor for use by ASW warfare aircraft. It is designed to use the Reliable Acoustic Path (RAP) propagation mode to provide air ASW warfare forces the option to conduct active (small area) search and rapid localization of submarines. Detection ranges will be significantly greater than those experienced with today's active sonobuoys. The sonobuoy is deployed at selectable depths from . In bottom limited environments ERAPS can be deployed to exploit duct and direct path conditions to gain ranges considerably longer than DICASS. Detection is gained by a 4.1 or 4.6Khz, high power transmitted pulse and a volumetric receiving array. Range, bearing and doppler are obtained.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:
1. (U) FY 1990 Accomplishments:
   a. (U) Completed Preliminary Design Review.
   b. (U) Continued contractor engineering tests.
   c. (U) Developed software to support DT/OT-IIA.
2. (U) FY 1991 Program:
   a. (U) Complete contractor evaluation tests.
   b. (U) Complete Critical Design Review.
   c. (U) Initiate contractor demonstration tests.
   d. (U) Validate DT/OT-IIA software.
3. (U) FY 1992 Plans:
   a. (U) Complete contractor demonstration tests.
   b. (U) Validate ERAPS specification compliance.
   c. (U) Complete DT-IIA.
4. (U) FY 1993 Plans:
   a. (U) Complete OT-IIA.
   b. (U) Initiate low rate initial production.
5. (U) Program to Completion:
   a. (U) Complete TECHEVAL and OPEVAL in 1994.
   b. (U) Initiate full rate production in 1995.

E. (U) WORK PERFORMED BY: IN-HOUSE: NADC, Warminster, PA; NAC, Indianapolis, IN; NWSC, Crane, IN; NATC, Patuxent River, MD., NSWC, White Oak, MD. CONTRACTORS: ERAPSCO (MAGNAVOX, FT WAYNE, IN/SPARTON, JACKSON, MS).

F. (U) RELATED ACTIVITIES:
PE 0604212N P-3 Modernization (host platform)

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604261N BUDGET ACTIVITY: 4-Tactical Programs
PROGRAM ELEMENT TITLE: Acoustic Search Sensors (Engineering)
PROJECT NUMBER: W0480 PROJECT TITLE: ASW Sensors and Processing

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0480	ASW Sensors and Processing	3,577	1,594	14,837	17,519	CONT.	CONT.

B. (U) DESCRIPTION: This project provides improved air ASW mission effectiveness through engineering development of hardware and software associated with acoustic systems, sensors, processing, post-processing, data recording, and displays for air ASW platforms. Key objectives: improved detection, classification, localization and tracking; and increased capacity and flexibility to handle multi-sensor data. The project will develop sonobuoy systems to improve airborne detection, localization/attack capability against potential submarine threats, and examine long range tactical sensors to provide ASW aircraft a balanced capability to detect both narrowband and broadband submarine acoustic signatures.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

a. (U) Acoustic Intercept System (AIS) - Completed Acquisition Plan (AP). Completed integration requirements definition and system performance specification. Release draft Request for Proposal (RFP).

2. (U) FY 1991 Program:

a. (U) AIS - Release formal RFP. Evaluate Proposals. Initiate AIS/P-3 Update III integration.

3. (U) FY 1992 Plans:

a. (U) AIS - Award FSED contract for the AIS detector development. Complete Preliminary Design Review (PDR). Continue AIS/P-3 Update III integration.

4. (U) FY 1993 Plans:

a. (U) AIS - Complete Critical Design Review (CDR). Continue AIS/P-3 Update III integration and test.

b. (U) Advanced Active Sonobuoy (AAS) - Complete AP, release RFP and award FSED contract.

5. (U) Program to Completion:

a. (U) This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAC, Indianapolis, IN; NADC, Warminster, PA; NOSC, San Diego, CA; NWSC, CRANE, IN; and NATC, Patuxent River, MD. CONTRACTOR: TBD.

PROGRAM ELEMENT: 0604261N BUDGET ACTIVITY: 4-Tactical Programs
PROGRAM ELEMENT TITLE: Acoustic Search Sensors (Engineering)
PROJECT NUMBER: W0480 PROJECT TITLE: ASW Sensors and Processing

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
1. (U) Technology Changes: None.
2. (U) Schedule Changes: Six months slip in AIS FSED contract award.
3. (U) Cost Changes: N/A

F. (U) PROGRAM DOCUMENTATION:

AIS	OR	2/90	AP	7/90
AAS	TOR	5/86		

G. (U) RELATED ACTIVITIES:
PE 0603254N, Air Anti-Submarine Warfare (advanced development)
PE 0604221N, P-3 Modernization (host platform)

H. (U) OTHER APPROPRIATION FUNDS: Not Applicable

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

J. (U) MILESTONE SCHEDULE:

	MSII	DT-IIA	OT-IIA	MS-IIIA
AIS	4Q/91	1Q/96	3Q/96	4Q/96
AAA	4Q/94	1Q/98	2Q/99	4Q/99

	MSII	DT-IIA	OT-IIA	MS-IIIA	DT-IIB	OT-IIB	MS-IIIB
AAS	4Q/93	3Q/97	4Q/97	1Q/98	2Q/99	4Q/99	1Q/00

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604261N BUDGET ACTIVITY: 4-Tactical Programs
PROGRAM ELEMENT TITLE: Acoustic Search Sensors (Engineering)
PROJECT NUMBER: W2000 PROJECT TITLE: Air Deployed Active Receiver (ADAR)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W2000	Air Deployed Active Receiver	- 0 -	11,623	10,032	13,728	CONT.	CONT.

B. (U) DESCRIPTION: The ADAR sonobuoy is an expendable air launched acoustic receiver utilized by ASW aircraft to receive pulses from ship and air deployed sources. The ADAR system will provide long range bistatic/multistatic detection and localization of quiet, slow-moving submarines in deep and bottom limited water. The sonobuoy will also be capable of functioning in a passive mode to track high speed targets. Intended mission areas include contact redetection, barrier protection, screening operations, and area search and surveillance.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Not Applicable
2. (U) FY 1991 Program:
   a. (U) Initiate processor software development.
   b. (U) Begin S-3B/ADAR integration.
3. (U) FY 1992 Plans:
   a. (U) Complete Milestone II.
   b. (U) Award FSED contract.
   c. (U) Continue ACAP (UYS-1) software development.
   d. (U) Continue S-3B/ADAR design and integration.
4. (U) FY 1993 Plans:
   a. (U) Complete contractor detailed design.
   b. (U) Complete sonobuoy Systems Design Review (SDR).
   c. (U) Initiate contractor engineering tests.
   d. (U) Continue S-3B/ADAR integration.
   e. (U) Continue ACAP software integration.
5. (U) Program to Completion: This is a continuing program

PROGRAM ELEMENT: 0604261N BUDGET ACTIVITY: 4-Tactical Programs
PROGRAM ELEMENT TITLE: Acoustic Search Sensors (Engineering)
PROJECT NUMBER: W2000 PROJECT TITLE: Air Deployed Active Receiver (ADAR)

D. (U) WORK PERFORMED BY: IN-HOUSE: NADC, Warminster, PA; NAC, Indianapolis, IN; NWSC, Crane, IN; NATC, Patuxent River, MD. CONTRACTOR: TBD.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
1. (U) Technology Changes: None.
2. (U) Schedule Changes: FSED contract award delayed 9 months to 2Q FY 1992.
3. (U) Cost Changes: N/A

F. (U) PROGRAM DOCUMENTATION:

OR	11/85 (HLA)
PCAD	2/89 (ADAR)
AP	(2/91)
TEMP	(6/92)

G. (U) RELATED ACTIVITIES:
PE 0602771N, Undersea Target Surv. Tech. (active source development)
PE 0603254N, Air Anti-Submarine Warfare (advanced development)
PE 0603708N, Advanced Acoustic Processing (detection algorithm development)
PE 0604221N, P-3 Modernization (host platform)

H. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

J. (U) MILESTONE SCHEDULE:

MS II	2Q/92
TECHEVAL	2Q/97
OPEVAL	3Q/97
MS III	4Q/97

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604261N BUDGET ACTIVITY: 4-Tactical Programs
PROGRAM ELEMENT TITLE: Acoustic Search Sensors (Engineering)
PROJECT NUMBER: W2001 PROJECT TITLE: Tactical Surveillance Sonobuoy (TSS)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W2001	Tactical Surveillance Sonobuoy	18,738	15,275	20,961	16,107	CONT.	CONT.

B. (U) DESCRIPTION: The Tactical Surveillance Sonobuoy (TSS), AN/SSQ-102, baseline system is designed for large area search against potential submarine threats. System consists of an expendable A-sized sonobuoy with trigger-controlled data storage capability (faster than real-time play-back mode), a 5-day in-water life, and associated avionics software modifications. The data storage/playback capability is used to provide a "force multiplier effect" which allows one aircraft to cover significantly larger areas than can be monitored with real-time sonobuoys. Enhanced Tactical Surveillance Sonobuoy (ETSS) will increase TSS system gain through array, in-buoy trigger modifications to maintain performance against the quieter 1990's potential threat including third world diesels and selectable depth and array design to allow opeartion in shallow water environments.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. (U) Completed contractor engineering tests.
   b. (U) Completed processor software development.
   c. (U) Completed critical design review.
   d. (U) Completed prototype display.
   e. (U) Completed design and code of DT/OT-IIA platform software.
   f. (U) Completed DT/OT-IIB platform integration requirements definition.
   g. (U) Initiated contractor demonstration tests.
2. (U) FY 1991 Program:
   a. (U) Complete contractor demonstration tests and validate specification compliance.
   b. (U) Complete checkout of DT/OT-IIA platform.
   c. (U) Complete integration of processor software with host platform release software.
   d. (U) Award incrementally funded contractor(s) option(s) for DT/OT-IIB test articles.
3. (U) FY 1992 Plans:
   a. (U) Complete DT/OT-IIA.
   b. (U) Initiate DT-IIB TECHEVAL.

PROGRAM ELEMENT: 0604261N BUDGET ACTIVITY: 4-Tactical Programs
PROGRAM ELEMENT TITLE: Acoustic Search Sensors (Engineering)
PROJECT NUMBER: W2001 PROJECT TITLE: Tactical Surveillance Sonobuoy (TSS)

4. (U) FY 1993 Plans:
   a. (U) Complete DT-IIB TECHEVAL and OT-IIB OPEVAL.
   b. (U) Initiate ETSS FSED and award contract(s).
5. (U) Program to Completion:
   a. (U) Complete ETSS contractor engineering tests and initiate contractor demonstration tests in FY 1994.
   b. (U) Complete ETSS contractor demonstration tests and host platform integration in FY 1995.
   c. (U) Initiate ETSS TECHEVAL in FY 1996.
   d. (U) Complete ETSS TECHEVAL and OPEVAL and initiate ETSS full rate production in FY 1997.
   e. (U) This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NADC, Warminster, PA; NAC Indianapolis, IN; NWSC, Crane, IN; NATC, Patuxent River, MD; NSWC, White Oak, MD; NUSC, New London, CT. CONTRACTORS: Magnavox, Ft. Wayne, IN: Hazeltine, Braintree, MA./Sippican, Marion, MA (joint venture).

E. (U COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
1. (U) Technology changes: None.
2. (U) Schedule changes: Milestone III-A delayed 3 months. Delay ETSS, FSED until FY 1993.
3. (U) Cost changes: N/A

F. (U) PROGRAM DOCUMENTATION:

	TSS	ETSS
TOR	6/85	6/85
DOP	12/85	12/85
OR	2/86	2/86
AP	8/86	10/91
TEMP	2/88	7/92

G. (U) RELATED ACTIVITIES:
PE 0602771N, Undersea Target Surveillance Technology (candidate technology approaches)
PE 0603708N, Advanced Acoustic Processing (detection algorithm development)
PE 0604211N, P-3 Modernization (host platform)
PE 0603228N, CV-ASW Module (operational support facility)
PE 0604231N, ASWOC C3 Upgrade (operational support facility)
PE 0604219N, CV-Helo Improvements (host platform)
PE 0604212N, LAMPS MKIII P3I (host platform)

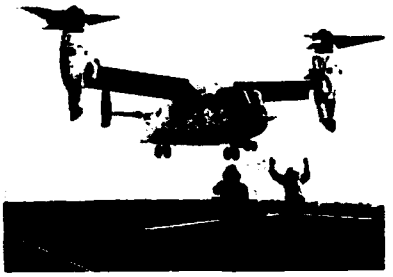
PROGRAM ELEMENT: 0604261N BUDGET ACTIVITY: 4-Tactical Programs
PROGRAM ELEMENT TITLE: Acoustic Search Sensors (Engineering)
PROJECT NUMBER: W2001 PROJECT TITLE: Tactical Surveillance Sonobuoy (TSS)

H. (U) OTHER APPROPRIATION FUNDS: Not Applicable.
I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.
J. (U) MILESTONE SCHEDULE:

	MS II	DT-11A	OT-IIA	MS IIIA (ALRIP)
TSS	4Q/87	1Q/92	2Q/92	3Q/92
ETSS	4Q/92	N/A	N/A	N/A
	TECHEVAL (DT-IIB)	OPEVAL (OT-IIB)	MSIIIB (AFRP)	
TSS	1Q/93	2Q/93	4Q/93	
ETSS	4Q/96	2Q/97	3Q/97	

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604262N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: V-22 OSPREY
PROJECT NUMBER: W1425 PROJECT TITLE: V-22 OSPREY
POPULAR NAME: V-22 OSPREY



A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	TO COMPLETE
PROGRAM MILESTONES					
ENGINEERING MILESTONES					
T&E MILESTONES	DT-IIA/3/90 DT-IIB/11/90	OT-IIA/6/91			
CONTRACT MILESTONES					

BUDGET ($K)	FY 1990	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL TO COMPLETE
MAJOR CONTRACT	206,200	188,675	0	0	2,204,928 0
SUPPORT CONTRACT	4,909	5,900	0	0	34,509 0
IN-HOUSE SUPPORT	37,386	40,600	0	0	190,186 0
GFE/ OTHER	5,241	1,800	0	0	33,941 0
TOTAL	253,736	236,975	0	0	2,463,564 0

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604262N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: V-22 OSPREY
PROJECT NUMBER: W1425 **PROJECT TITLE:** V-22 OSPREY
POPULAR NAME: V-22 OSPREY

B. (U) DESCRIPTION: The V-22 program was designed to provide an aircraft to meet the amphibious/vertical assault needs of the Marine Corps, the combat search and rescue needs of the Navy, and the special operations needs of the Air Force. The V-22 would have replaced the CH-46 in the Marine Corps, the HH-3A in the Navy, supplement the H-53, H-60 and C-130 in the Air Force.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:
   a. (U) Aircraft #1, #2, #3 and #4 have a total of 275 flights of FSD testing.
   b. (U) DT-IIA and DT-IIB testing have been completed.

2. (U) FY 1991 PROGRAM:
   a. Continue V-22 flight test program. There are currently a total of 307 flights and 361 hours of flight on Aircraft #1 thru #4. Aircraft #5 first flight is scheduled for 1 April 1991. DT-IIC and OT-IIA testing is scheduled.
   b. Conclude RDT&E efforts.

D. (U) WORK PERFORMED BY:

IN HOUSE: NAVAIRDEVCEN (Avionics Engineering) Warminster, PA; NAVAIRTESTCEN (Operational Testing) Patuxent River, MD; NAVAVIONICCEN (Avionics Software) Indianapolis, IN; NAVAVNDEPOCEN CHPT (Logistics Support) Cherry Point, NC; CG MCDEC (Flight Test Support) Quantico, VA; NAVAIRENGCEN (Systems Engineering) Lakehurst, NJ; NAVAVNMAINTOFF (Maintenance Trainer) Patuxtent River, MD; NAVAIRPROPCEN (Propulsion Systems) Trenton, NJ

CONTRACTORS: Bell-Boeing (Air Vehicle) Fort Worth, TX and Philadelphia, PA; Allison Gas Turbine Division, General Motors Corp., (Engines) Indianapolis, IN.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604262N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: V-22 OSPREY
PROJECT NUMBER: W1425 PROJECT TITLE: V-22 OSPREY
POPULAR NAME: V-22 OSPREY

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) TECHNICAL CHANGES: Not Applicable.

2. (U) SCHEDULE CHANGES: Program in FY 1990 President's Budget Submit.

3. (U) COST CHANGES: Program only continues in RDT&E with funds provided by Congress. Congress added $238,000 million RDT&E and $165,000 in Advanced Procurement.

F. (U) PROGRAM DOCUMENTATION:

JSOR	8/85
DCP	5/86
JTP/NTP	12/86
TEMP M960 REV 1	3/89
ACQ PLAN	3/89

G. (U) RELATED ACTIVITIES: Not Applicable.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
APN-1	0	165,000*	0	0	0	498,924

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) TEST AND EVALUATION: Not Applicable.

FY-1992/3 RDT&E, NAVY DESCRIPTIVE SUMMERY

PROGRAM ELEMENT: 0604264N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Aircrew Systems Development
PROJECT NUMBER: W0606 PROJECT TITLE: Aircrew Systems Development

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY-90 ACT	FY-91 EST	FY-92 EST	FY-93 EST	TO COMPLETE	TOTAL PROGRAM
W0606	ASD	20,661	18,127	17,318	17,089	Cont.	Cont.

B. (U) DESCRIPTION: This program provides engineering development, evaluation, fleet introduction and support of aircrew clothing and devices which enhance mission performance; protects from natural and generated stresses and hazards; and integrates with in-flight escape and rescue provisions. Program includes the adaptation of nondevelopment items, joint service developments, NATO/allied cooperative ventures, and integration with existing Navy aviation life support systems (ALSS), aircraft and maintenance/logistics processes. Subprojects: a. In-flight systems; On Board Oxygen Generating System (OBOGS), Advanced Technology Crew Station (ATCS), Advanced Integrated Life Support Systems (AILSS); b. Escape/Crash Safety: Naval Aircrew Common Ejection Seat Pre Planned Product Improvement (NACES P^3I), Advanced Crashworthy Aircrew Seat System (ACASS), Inflatable Body And Head Restraint System (IBAHRS); c. Survival and Rescue: Passenger Anti-Exposure Survival System (PAESS); d. Special Mission Equipment: Laser Eye Protection Visor (LEPV), Naval Aircrew Eye Respiratory Protection (NAERP); e. Mission Specific: Helicopter Helmet Replacement Program (HHRP), Aircrew Integrated Survival Armor Protection (AISAP), Cats-eyes Emergency Ejection Detachment System (CEEDS).

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

a. (U) Inflight Systems: OBOGS: New monitor development. ATCS: Developed crew station design guidelines.

b. (U) Escape and Crash Safety Systems: NACES P^3I: Initiated DT-I. ACASS: Initial DT-I testing. IBAHRS: Initial development.

c. (U) Survival and Rescue Systems: PAESS: Continued development.

d. (U) Special Mission Equipment: LEPV: Spectacle program terminated. NAERP: completed DT; initial TECHEVAL P-3C.

e. (U) Mission Specific Equipment: HHRP: TECHEVAL Complete; AISAP: Continued Advanced Development. CEEDS: Design analysis.

2. (U) FY 1991 Program:

a. (U) OBOGS: Monitor TECHEVAL. AILSS: Transition to 6.4. ATCS: DT of proposed design, guidelines and design tools.

FY-1992/3 RDT&E, NAVY DESCRIPTIVE SUMMERY

PROGRAM ELEMENT: 0604264N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Aircrew Systems Development
PROJECT NUMBER: W0606 PROJECT TITLE: Aircrew Systems Development

b. (U) NACES P^3I: DT-I/II restraint systems evaluation. ACASS: DT-I and begin DT-II. IBAHRS: Continue design/development.

c. (U) PAESS: Complete TECHEVAL.

d. (U) Special Mission Equipment. NAERP: Complete AV-8B TECHEVAL, P-3C initiate OPEVAL.

e. (U) HHRP: Down selection to one source; OPEVAL; AFRP; IOC. AISAP: Complete TECHEVAL. CEEDS: Procure Prototypes, lab test, procure pre-production units, prepare ECP, prepare specifications and prepare technical data package, begin ILS.

3. (U) FY 1992 Plans:

a. (U) OBOGS: Prepare monitor ECP; Initiate multi-man DT. AILSS: Initiate DT. ATCS: Complete DT design guidelines and Spec revisions.

b. (U) Continued P^3I for a 700 kts system, complete DT-I/II for restraint system, Initiate TECHEVAL. ACASS: DT-II testing , Level II/III data package. IBAHRS: Complete DT-I, start DT-II testing.

c. (U) PAESS: Complete OPEVAL.

d. (U) LEPV: Start DT&E. NAERP: AV-8B OPEVAL, Milestone III.

e. (U) AISAP: Complete OPEVAL. CEEDS: ECP Approval.

4. (U) FY 1993 Plans:

a. (U) OBOGS: Multi-man concentrator TECHEVAL. AILSS: Conduct TECHEVAL. ATCS: DT-I subsystem testing/verification of design tools.

b. (U) NACES (P3I): Complete DT-II effort on 700 kts system, complete TECHEVAL, begin OPEVAL. ACASS: Complete DT-II testing. IBAHRS: Complete DT-II testing, Milestone IIIB decision.

c. (U) PAESS: Milestone III.

d. (U) LEPV: Complete DT & OT; seek AFRP. NAERP: Transition to production.

e. (U) AISAP: Milestone III. CEEDS: Award contract; IOC 3rd Quarter.

5. FY 1994 Plans:

a. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRDEVCEN, Warminster, PA; NAVORDSTA, Indian Head, MD; NAVAIRTESTCEN, Patuxent River, MD; NAVWPNCEN, China Lake, CA;NADEP, Norfolk, VA; OPTEVFOR, Norfolk, VA; NAC, Indianapolis,IN. CONTRACTORS: Martin Baker Aircraft Co, Ltd., Middlesex, England; Litton Industries, Davenport, IA; McDonnell Aircraft Co, St. Louis, MO; Boeing Advanced Systems Co,Seattle, WA.

FY-1992/3 RDT&E, NAVY DESCRIPTIVE SUMMERY

PROGRAM ELEMENT: 0604264N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Aircrew Systems Development
PROJECT NUMBER: W0606 PROJECT TITLE: Aircrew Systems Development

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET
1. (U) TECHNOLOGY CHANGES: None.
2. (U) SCHEDULE CHANGES: Outyear delays in ATCS and AILSS.
3. (U) COST CHANGES: Reduction of 2.8M(FY91) will stretch out ATCS and AILSS programs with minor scope adjustments.

F. (U) PROGRAM DOCUMENTATION:

	OR	TEMP		OR	TEMP
NACES	12/83	12/89	PAESS	8/86	In review
OBOGS		5/83	NAERP	11/86	6/89
LEPV	6/86	7/89	AISAP	3/88	Being Prepared
HHRP	1/88	5/90			

G. (U) RELATED ACTIVITIES: P.E. 0602122N, Aircraft Technology; P.E. 0602233N, Mission Support Technology; P.E. 0603216N, Aircrew Systems Technology. Related Air Force efforts, support by P.E. 0604706F, Life Support Equipment, and Army efforts, supported by P.E. 0604713A, Combat Feeding, Clothing and Equipment. Coordinated through the OSD sponsored Tri-Service Life Support RDT&E Steering Committee.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
NAERP						
APN-5	0	0	4,100	5,700	6,400	16,200

(U) MILCON: Not applicable

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None

J. (U) MILESTONE SCHEDULE:

	II	IIIA	IIIB		II	IIIA	IIIB
NAERP	3Q/88	4Q/90	3Q/91	PAESS			2Q/93
AISAP	(Interim)		ECP	AISAP	(Final)		3Q/93
HHRP			4Q/91				

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604265N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Air Launch Saturation System
PROJECT NUMBER: W2002 PROJECT TITLE: ALSS
POPULAR NAME: Air Launch Saturation System

PICTURE NOT AVAILABLE

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	TO COMPLETE
Program Milestones				MSII (4Q)	
Engineering Milestones					
T&E Milestones					
Contract Milestones					

BUDGET ($K)	FY 1990	FY 1991	FY 1992	FY 1993	Program Total To Complete
Major Contract	0	0	0	3,004	CONT
Support Contract	0	0	350	370	CONT
In-House Support	1,693	0	7,181	3,912	CONT
GFE/ Other	0	0	0	0	CONT
TOTAL	1,693	0	7,531	7,286	CONT

PROGRAM ELEMENT: 0604265N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Air Launched Saturation System (ALSS)
PROJECT NUMBER: W2002 PROJECT TITLE: ALSS

B. (U) DESCRIPTION: Air Launched Saturation System is an alternative to Tacit Rainbow, P.E. 0207316N, to meet the need for a low-cost programmable-before-launch, loitering missile system capable of searching out and attacking enemy emitters. This system will provide commanders with a weapon that can suppress/destroy the enemy's ability to acquire and attack friendly forces. It may also be used for defense saturation. These requirements are contained in the Joint Services Operational Requirement (JSOR) for the Air-Launched Loitering Missile dated 15 December 1988.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments(Tacit Rainbow):
   a. (U) DAB approved second source technology transfer.
   b. (U) Continued mission planning development.
   c. (U) Continued DT&E.
   d. (U) Navy will initiate storage site activation.
2. (U) FY 1991 Program: Not applicable
3. (U) FY 1992 Plans:
   a. (U) Review current design for applicability with emphasis on design strengths for potential incorporation.
   b. (U) Explore other concepts via trade-off studies and/or requests for quotes (RFQ).
   c. (U) Develop specifications to adequately meet Navy requirements.
4. (U) FY 1993 Plans:
   a. (U) Continue efforts with the intent of commencing full scale development activities in FY 1994 or earlier depending on design maturity and program funding.
5. (U) FY 1994 through 1997 Plans:
   a. (U) Continue full scale development activities.
6. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: Naval Weapons Center, China Lake, Ca. CONTRACTORS: TBD.

PROGRAM ELEMENT: 0604265N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Air Launch Saturation System
PROJECT NUMBER: W2002 **PROJECT TITLE:** ALSS

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) Technology Changes: None.
2. (U) Schedule Changes: Not applicable.
3. (U) Cost Changes: None.

F. (U) PROGRAM DOCUMENTATION:
JSOR 12/88

G. (U) RELATED ACTIVITIES: None.

H. (U) OTHER APPROPRIATION FUNDS: None.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

J. (U) TEST AND EVALUATION: Not applicable to this submission.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604268N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: A/C ENGINE COMP IMP PROGRAM
PROJECT NUMBER: W1355 Project Title: A/C ENG COMP IMP PROGRAM

A. (U) RESOURCES: (DOLLARS IN THOUSANDS)

PROJECT NUMBER	TITLE	FY 1990 Actual	FY 1991 Estimate	FY 1992 Estimate	FY 1993 Estimate	TO COMPLETE	Total Program
W1355	Engine CIP	35,009	37,049	58,856	67,993	Cont.	Cont.

B. (U) DESCRIPTION: Aircraft Engine Component Improvement Program (CIP) is the only source of engineering support for all in-service Navy aircraft engines, transmissions, propellers, starters, auxiliary power units, electrical generating systems, fuel systems, and fuels and lubricants. The missions, tactics, and environmental exposure of military aircraft systems are often changed to meet new threats or operational demands. One such current example is the sand exposure in the DESERT SHIELD/STORM operation. These changes often result in unforeseen problems which, if not resolved, result in either safety or readiness degradation. Development programs, while geared to resolve as many problems as possible before deployment, cannot duplicate actual operations or account for the vast array of environmental and usage variables. Therefore, it is essential to conduct continuing engineering efforts on these systems. The highest priority of CIP is to address all safety of flight issues. Another objective is to ensure that engines maintain required specification performance. CIP is also an effective way to reduce the cost of engine ownership and improve system operational readiness. Reliability, maintainability, supportability, and sustainability are improved as Fleet service time accumulates. The CIP process starts after engine development and Navy acceptance of the first production engine. CIP continues over the engine's life, gradually decreasing to a minimum level sufficient to keep older inventory operational. CIP addresses usage and life problems not covered by engine warranties. CIP is a tri-service program with Foreign Military Sales participation. CIP investments reduce operation and support costs by an average factor of sixteen to one.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

a. (U) F110 Engine (F-14A+ TOMCAT AND F-16N FALCON) - Allowed for successful deployment of F-14A+ by providing fixes for lubrication, fuel systems, and engine control problems. Without the CIP effort, the deployment would not have been accomplished on schedule.

b. (U) F404 Engine (F/A-18 HORNET) - Qualified and incorporated multiple improvements to eliminate engine-related mishaps. Compressor improvements will minimize failures and Titanium fire potential. Afterburner improvements eliminate top readiness degraders with other analysis and hardware developments improving durability and reducing life cycle costs.

c. (U) F402 Engine (AV-8B HARRIER) - Developed software and

PROGRAM ELEMENT: 0604268N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: A/C ENGINE COMP IMP PROGRAM
PROJECT NUMBER: W1355 PROJECT TITLE: A/C ENG COMP IMP PROGRAM

hardware improvements to eliminate Digital Engine Control System failures. Qualified durability improvements to increase engine reliability and conducted complete Failure Modes and Effects Analysis to preclude future failures.

d. (U) J52 Engine (TA-4J SKYHAWK, A-6E INTRUDER, AND EA-6B PROWLER) - Developed hardware to correct fuel leaks and other safety-of-flight malfunctions in the main fuel control. Qualified improved engine compressor and hot section parts that have longer lives and lower support costs.

e. (U) T700 Engine (SH-60 SEAHAWK) - CIP has resolved serious T700 safety issues. Control, anti-ice/Start bleed valve, and alternator system improvements were developed to allow lifting fleet imposed flight restrictions and restoring pilot confidence. Engine flameouts while using JP-4 fuel are being reduced by changes to fuel pump design. Compressor stalls and inflight shutdowns are being resolved through redesign of output drive assembly bearings.

f. (U) T58 Engine (H-2, H-3, H-46 Helicopters) - In flight engine stalls precluded by improving stator vane actuation system.

g. (U) TF30 Engine (F-14A TOMCAT) - Qualified engine durability improvements that will reduce fuel leaks and increase interval between failures. Developed repair procedures that reduced support costs.

h. (U) TF34 Engine (S-3 VIKING) - Continued stall overtemp investigation to eliminate deployed operational deficiency and doubled service life of high pressure turbine blade material.

i. (U) T64 Engine (H-53 Helicopter/Minesweeper) - Defined Low Cycle Fatigue lives and removed high usage fleet parts prior to rupture. Conducted investigation and projected repair requirements for DESERT SHIELD/STORM operations.

j. (U) PROPELLERS - Corrected E-2C (PLUS) uncommanded shutdown problems.

2. (U) FY 1991 Program: Expect a significant amount of investigation and life projection work to support DESERT SHIELD/STORM operations. On site hardware inspections and engineering analyses will be required. Improvement programs will be initiated to address DESERT SHIELD/STORM related problems. We will initiate support of the recently deployed AV-8B engine upgrade. No systems are being retired and work to eliminate safety hazards and improve readiness and supportability will continue.

3. (U) FY 1992 Plans:

a. (U) Continue effort on each engine to reduce in-flight aborts, aircraft safety incidents, not-mission-capable rates, scheduled and unscheduled engine removals, maintenance man-hours, and overall costs.

PROGRAM ELEMENT: 0604268N BUDGET ACTIVITY: 4
TITLE: A/C ENGINE COMP IMP PROGRAM
PROJECT NUMBER: W1355 PROJECT TITLE: A/C ENG COMP IMP PROGRAM

b. (U) Effort will begin on the F405 engine on the T-45A aircraft and an enhanced performance engine for the F/A-18 aircraft.

4. (U) FY 1993 Plans: Continue effort on each engine to reduce in-flight aborts, aircraft safety incidents, not-mission-capable rates, scheduled and unscheduled removals, maintenance man-hours, and overall costs.

5. (U) Program To Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRPROPCEN, Trenton, NJ; NAVAIRTESTCEN, Patuxent River, MD; NAVAIRDEVCEN, Warminster, PA; and NAVWPNSUPPCEN, Crane, IN. CONTRACTORS: Allison Gas Turbine Division, Indianapolis, IN; General Electric Company, Lynn, MA and Evendale, OH; Garrett Turbine Engine Co., Phoenix, AZ; Pratt and Whitney Aircraft Group, West Palm Beach, FL; and Rolls Royce, Bristol, England.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
1. (U) TECHNICAL CHANGES: Not applicable.
2. (U) SCHEDULE CHANGES: Not applicable.
3. (U) COST CHANGES: The reduction of 4.835M in FY 91 is the result of Congressional action.

F. (U) PROGRAM DOCUMENTATION: Acquisition Plan No. A42-48-0-50 Revision B approved 13 August 1987.

G. (U) RELATED ACTIVITIES: CIP is a tri-service program which includes cost sharing with commercial and foreign users, where applicable. Each service administers the engine contract for engines they developed with the other services as members, therefore, eliminating unnecessary duplication of effort.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable. Work tasks under the 13 to 16 CIP contracts are established and managed individually to resolve fleet problems and reduce cost of ownership.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604270N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: CONSOLIDATED EW PROGRAM

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R1882	DVAL	920	1,004	806	800	Cont.	Cont.
R1742	EW TECH DEV	897	906	926	941	Cont.	Cont.
C0066	C/NCOMM ECM	448	2,482	125	42	0	12,617
C1961	MEWSS	1,467	1,269	1,003	0	1,436	8,299
S0954	SURFACE EW	40,481	45,573	42,356	40,333	Cont.	Cont.
W0638	ABN DEF ECM	49.602	60,735	73,043	74,349	Cont.	Cont.
W0619	ASPJ	5,243	11,464	0	0	0	265,514
W0556	EW CNT RES	12,829	11,486	24,024	32,926	33,901	652,200
X1794	COUNTER COMM	170	0	0	0	0	170
X1795	CMAS	3,889	3,705	Moved to PE 0605853N			
TOTAL		115,946	138,624	142,283	149,391	Cont.	Cont.

B. (U) DESCRIPTION: This element includes development of electronic warfare systems for USN/USMC tactical aircraft, USMC helicopters, surface combatants, data-link vulnerability assessments, USMC communications and non-communications jammers, and development and testing of electronic warfare devices for emergency contingencies.

PROGRAM ELEMENT: 0604270N BUDGET ACTIVITY 4
PROGRAM ELEMENT TITLE: CONSOLIDATED EW PROGRAM
PROJECT NUMBER: R1882 PROJECT TITLE: DATALINK EVALUATION ANALYSIS (DVAL)

C. (U) DESCRIPTION: DVAL evaluates the anti-jam capabilities of Navy electromagnetically dependent systems in the developmental stages of the acquisition cycle. It identifies methods for reducing signal vulnerabilities to hostile exploitation. The resultant information is used during development to take corrective action when necessary. It is also used after fleet introduction for use in developing countermeasure tactics. It incorporates another facet of vulnerability assessment, ECCM Requirements and Assessment Manual (ERAM) which when completed, will provide a tool for program sponsors and managers to clearly state ECCM requirements "up front" in the R&D rocess. ERAM consists of five manuals (increments) providing realistic engagement scenarios and measures of effectiveness to facilitate writing of contract specifications, defining testing environment, providing tools for fleet training and tactics.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:

a. (U) Began analysis of Common High Bandwidth Data Link (CHBDL) for BGPHES and ATARS programs. Completed JTIDS, MILSTAR, EHF SATCOM and NAVSTAR GPS.

b. (U) Published ERAM Increment II (Air to Air Surveillance) and F/A-18 Annex to Increment IV (Air to Surface); released first revision of Increment I (Air to Air).

2. (U) FY 1991 PROGRAM:

a. (U) Continue Preliminary analysis of CHBDL. Begin analysis of HAVE QUICK/SINCGARS systems. Begin revision of DVAL Methodology. Publish ERAM Increment III (Surface to Air); produce working draft of ERAM Increment IV; release revision 2 of Increment I.

3. (U) FY 1992 PLANS:

a. (U) Develop CHBDL preliminary Susceptibility reports. Continue preliminary analysis of HAVE QUICK/SINCGARS. Continue revision of DVAL Methodology. Develop preliminary analysis of Battle Group Cooperative Engagement Concept (BGCEC).

b. (U) Publish ERAM Increment IV; release ERAM Increment II revision 1; produce working draft ERAM Increment V (Surface to Surface).

4. (U) FY 1993 PLANS:

a. (U) Develop CHBDL susceptibility pre-test planning document and preliminary Interceptibility reports. Complete HAVE QUICK/SINCGARS Interceptibility module/begin assessibility/feasibility pre-test planning document. Continue development of BGCEC. Complete revision of DVAL Methodology.

b. (U) Publish ERAM Increment V; release revision 3 ERAM Increment I; release revision 2 ERAM Increment II; release revision 1 ERAM Increment III.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL Washington DC; NAVAIRTESTCEN Patuxent River MD. CONTRACTORS: Johns Hopkins University, Applied Physics Laboratory, Laurel MD; Georgia Tech Research Institute, Atlanta GA. ERAM work performed by NWC China Lake, CA.

F. (U) RELATED ACTIVITIES: PE 0603261N TAC AIRBORNE RECON.

G. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604270N BUDGET ACTIVITY: 4
PROGRAM ELEMEMT TITLE: CONSOLIDATED EW PROGRAM
PROJECT NUMBER: R1742 PROJECT TITLE: EW DEVELOPMENT AND TESTING (EWD&T)

C. (U) DESCRIPTION: Establishes a standing research group for developing and testing low cost, high payoff Electronic Warfare systems.

D. ( ) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. ( ) FY 1990 ACCOMPLISHMENT: Developing a small ship ASMD EW system to enhance the effectiveness of offboard radar countermeasures. System is based upon long range detection of and includes a computer controlled jammer to assist in decoy distraction.

2. ( ) FY 1991 PROGRAM: Develop and test a podded countertargeting jammer suitable for fighter/attack aircraft in the outer air battle.

3. ( ) FY 1992 PLANS: Develop and test

4. ( ) FY 1993 PLANS:

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: Naval Research Laboratory, Washington D.C.; Pacific Missile Test Center, Pt, Mugu, CA; Naval Weapons Center, China Lake, CA; Naval Ordnance Laboratory, Crane IN.

F. (U) RELATED ACTIVITIES: None.

G. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

FY 1992 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604270N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: CONSOLIDATED ELECTRONIC WARFARE PROGRAMS
PROJECT NUMBER: C0066 PROJECT TITLE: COMMUNICATIONS AND NON-COMMUNICATIONS ELECTRONIC COUNTERMEASURES (COM/NON-COMM ECM)

C. (U) DESCRIPTION: The goal of this program is to satisfy the continuing requirement for COMM/NON-COMM ECM systems which will provide the Marine Corps the ability to jam/deceive enemy transmitters. An expendable jammer installed on the Very Low Cost Unmanned Aerial Vehicle (UAV) will provide the capability to aid in the disruption of rear echelons of enemy troop communications. A standoff communications jammer is required for Very High Frequency (VHF) and Ultra High Frequency (UHF) as a replacement for the currently fielded AN/ULQ-19 jammer. A similar requirement also exists for a system capable of jamming High Frequency (HF) communications.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
a. (U) Conducted engineering tests on jammer power generation and engineering studies on antenna requirements for the expendable jammer.
b. (U) Completed documentation and prepared for procurement of the VHF/UHF Communications jammer.
c. (U) Completed market survey for HF communications jammer and generated strategy for full scale development.
2. (U) FY 1991 Program: Complete jammer development and integration with designated joint project office (JPO) UAV. Continue monitoring U.S. Navy's USQ-113V communications jammer program.
3. (U) FY 1992 Plans: Complete testing and documentation for expendable jammer procurement.
4. (U) FY 1993 Plans: Begin procurement of expendable jammers.
5. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: Naval Air Test Center, Patuxent River, MD. CONTRACTORS: Atlantic Research Corp., Dumfries, VA.

F. (U) RELATED ACTIVITIES: US Navy, USQ-113V Communications Jammer.

G. (U) OTHER APPROPRIATION FUNDS: None

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None

FY 1992 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604270N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: CONSOLIDATED ELECTRONIC WARFARE PROGRAMS
PROJECT NUMBER: C1961 PROJECT TITLE: MOBILE ELECTRONIC WARFARE SUPPORT SYSTEM (MEWSS)

C. (U) DESCRIPTION: MEWSS is an electronic warfare suite of equipment designed to fit in a highly mobile tactical vehicle, a Light Armored Vehicle (LAV) chassis. It will provide the ground commander with a mobile electronic warfare system capable of operating in a variety of tactical situations. MEWSS will detect, locate and degrade enemy tactical AM and FM radio communications.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Completed engineering analysis on increasing on-board power. Designed, contracted and installed prototype power increase hardware into the MEWSS engineering development system. Tested and approved modified power system. Developed and approved Modification Installation for new MEWSS power system. Initiated engineering analysis on MEWSS thermal design to improve equipment cooling.
2. (U) FY 1991 Program: Complete integration of MEWSS Test Bed system. Conduct Test Bed evaluation. Initiate engineering of "approved" Test Bed system into the MEWSS LAV. Complete engineering of new thermal design. Complete power distribution engineering. Initiate engineering of Land Navigation System into MEWSS Product Improvement (PIP).
3. (U) FY 1992 Plans: Test MEWSS prototype. Complete final engineering design for MEWSS Product Improvement.
4. (U) FY 1993 Plans: N/A
5. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: Pacific Missile Test Center (PMTC), Point Mugu, CA. CONTRACTORS: Atlantic Research Corporation, Dumfries, VA; Watkins Johnson Co., Savage, MD.

F. (U) RELATED ACTIVITIES: None

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT						
MEWSS PIP	0	0	2,902	3,168	11,203	17,273

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None

PROGRAM ELEMENT: 0604270N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: CONSOLIDATED EW PROGRAM
PROJECT NUMBER: S0954 PROJECT TITLE: SHIPBOARD EW IMPROVEMENTS

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0954	Shipboard EW Improvements	40,481	45,573	42,356	40,333	Cont.	Cont.

B. (U) DESCRIPTION: The Shipboard EW Improvements Program is focused on three major efforts: (1) On-board precision electronic support measures (ESM) and active electronic countermeasures (ECM), (2) Ship Signature Management and (3) Offboard Active Countermeasures. Onboard EW Improvements include Over-the-Horizon Detection (OTH-D), Countertargeting Countermeasures, Improved Anti-ship Missile Deception Electronic Countermeasures (ASM/DECM), DECM/Decoy Integration (DDI), Rapid ASMD Integrated Defense System (RAIDS), Advanced Integrated EW System (AIEWS) and Light Weight EW System for Small Ships. Ship Signature Management includes Radar Cross Section (RCS) and Infrared (IR) signature measurement and development of ship treatment techniques. Offboard Countermeasures (CM) include NULKA (a Ship Launched Electronic Decoy), TORCH IR Decoy, and Recoverable Offboard Active Decoy/Jammer.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY1990 ACCOMPLISHMENTS:
   a. (U) Awarded FSED System contract for the AN/SLQ-32(V)4 Upgrade.
   b. (U) Conducted AN/SLQ-32 ADCAP EDM factory test.
   c. (U) Initiated DDI CV/CVN RF distraction effort.
   d. (U) Conducted DT/-1A for RAIDS program. Completed Draft RAIDS TEMP. Continued RAIDS architecture design and prototype software development.
   e. ( ) Cont.
   f. (U) NULKA - Payload EDM 1 and 2 delivered/Launcher delivered.
   g. (U) NULKA - DT-IIA Installation complete/DT-IIA test started.
   h. (U) Completed testing of MK 186 MOD 2 gas generator and fuel.
2. (U) FY1991 PLANS:
   a. (U) Continue AN/SLQ-32(V)4 Upgrade FSED: SRR.
   b. (U) Initiate ADCAP Increase-in-Scope effort.
   c. (U) Award FSED contract for Phase E Improvements.
   d. (U) Conduct DDI field testing with SLQ-32(V)3.
   e. (U) Continue DDI CV/CVN RF distraction effort.
   f. (U) Continue development of RAIDS. Conduct DT-1B & OT-1A.
   g. (
   h. (U) NULKA Continue DT-IIA/DT-IIB Tests.
   i. (U) Complete MK 186 MOD 2 TECHEVAL/OPEVAL.
   j. (U) NULKA Payload CDR/Vehicle/Launcher CDR.
   k. (U) AOD - Support development of an EW payload and flight demonstration on unmanned Air Vehicles.
   l. (
   m. (U) Evaluate Non-Developmental Items (NDI) for Small Ship Light Weight EW System (SLEWS).

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY
PROGRAM ELEMENT: 0604270N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: CONSOLIDATED EW PROGRAM
PROJECT NUMBER: S0954 PROJECT TITLE: SHIPBOARD EW IMPROVEMENTS

3. (U) FY1992 PLANS:
   a. (U) Continue PHASE E FSED; SRR and PDR.
   b. (U) Conduct DDI at-sea testing with SLQ-32(V)3.
   c. (U) Conduct DDI CV/CVN RF distraction field testing.
   d. (U) Conduct DDI field and at-sea testing in conjunction with ADCAP testing.
   e. (U) RAIDS DT-II; IOC for Phase I.
   f. ( ) Continue
   g. (U) NULKA - Conduct DT-IIC, DT-IID, OT-IIA.
   h. (U) AOD - Continue development of the OACM.
   i. (U) Continue development of improved IR decoy.
4. (U) FY1993 PLANS:
   a. (U) Conduct AN/SLQ-32(V)4 Upgrade EDM factory test.
   b. (U) Continue AN/SLQ-32(V) Phase E FSED; CDR.
   c. (U) Conduct DDI CV/CVN RF distraction at-sea test.
   d. (U) RAIDS Eng. Dev. for Phase II and cross class adaptation.
   e. ( ) Continue
   f. (U) NULKA - MS IIIA decision.
   g. (U) AOD - Start FSED.
   h. (U) Continue development of improved IR decoy.
5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, DC; NSWC, Dahlgren, VA and White Oak, MD; NWSC, Crane, IN; NOSC, San Diego, CA; NESEC, Portsmouth, VA; FCDSSA, Dam Neck, VA; COMOPTEVFOR, Norfolk, VA; SPCC, Mechanicsburg, PA. CONTRACTORS: Raytheon Co., Goleta, CA; ARGO Systems, Inc., Sunnyvale, CA; S.T. Research Corp., Newington, VA; General Instrument, Hicksville, NY; Sippican, Inc., Marion, MA; AWA, Australia; Dalmo Victor, Belmont, CA; Norden Systems, Inc., Melville, NY; Hughes Aircraft, Fullerton, CA; Varian Assoc., Palo Alto, CA; EATON-AIL, Westlake, CA; Teledyne MEC, Palo Alto, CA; HRB Singer, Inc., Lanham, MD; Vector, Alexandria, VA; UNISYS Corp., Great Neck, NY.

E. (U) COMPARISON WITH FY1991 PRESIDENTS BUDGET:
   1. (U) TECHNOLOGY CHANGES: None
   2. (U) SCHEDULE CHANGES: The department has determined that full production of the expendable Active Electronic Buoy is unaffordable although it passed OPEVAL. An effort will be made to repackage the active payload portion as a recoverable decoy and demonstrate the capability at sea in 3rd Qtr/FY91.
   3. (U) COST CHANGES: None.

F. (U) PROGRAM DOCUMENTATION:
   1. (U) AN/SLQ-32(V)4 UPGRADE TEMP - Sept 85; Update in process.
   2. (U) Phase E RFP and TEMP in process.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY
PROGRAM ELEMENT: 0604270N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: CONSOLIDATED EW PROGRAM
PROJECT NUMBER: S0954 PROJECT TITLE: SHIPBOARD EW IMPROVEMENTS

3. (U) DDI TEMP -- Jun 84; Update in process.
4. (U) ADCAP TEMP and Increase-in-scope in process.
5. (U) RAIDS OR in review. RAIDS TEMP in process.
6. (U) NULKA TEMP-Joint TEMP signed by USN OCT 88. Rev. 1 in process.
7. (U) OAD-OR 10/87; TEMP 07/88.
8. (U) OUTLAW BANDIT OR 05/87; TEMP 03/90; AP 08/90.

G. (U) RELATED ACTIVITIES: None.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	(U) OPN	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
1.	(U) SLQ-32#73	73,373	84,156	125,813	114,839	Cont.	Cont.
2.	(U) Countermeasures #79	13,805	9,164	21,098	28,648	Cont.	Cont.
3.	(U) ASMD Systems (Launchers)#228	8,841	2,294	5,042	5,291	Cont.	Cont.
4.	(U) Shipboard Expendable CM #240	32,387	51,300	50,462	44,412	Cont.	Cont.

I. ( ) INTERNATIONAL COOPERATIVE AGREEMENTS: Project NULKA is a to develop an advanced electronic warfare decoy system to protect surface ships against ASMs. MOA signed by SECNAV and the MOD in August 1986. Total program cost, in U.S. dollars $94 million. The U.S share of the common work is 78%, The U.S is responsible for developing the electronic payload. is responsible for developing the rocket motor, flight control systems, launcher and the final system integration. U.S. prime contractor is Sippican, Inc. Program is in R&D phase. Payload CDRs were held in August 88. System PDRs held in Oct 88 and Feb 89.

(U) U.S. R&D Funding (dollars in millions)

FY 1990	FY 1991	FY 1992	TO COMPLETE
17.8	11.6	5.2	0

J. ( ) MILESTONE SCHEDULE:
1. (U) SLQ-32 low band OT&E - FY90/4Q
2. ( ) SLQ-32 High band and EMI improvement OT&E -
3. (U) SLQ-32 CV/CVN OT&E - FY91/2Q
4. (U) DDI DT/OT/III at-sea test FY92
5. (U) SLQ-32 Advanced Capability (ADCAP)-DDI DT/OT at sea test FY92/4Q
6. (U) SLQ-32 PHASE E start FY91/4Q.
7. ( ) NULKA DT-IIA -
8. ( ) NULKA Hero/EMC/EMI
9. ( ) NULKA DT-IIB -
10. ( ) NULKA DT-IIC -
11. ( ) NULKA TECHEVAL
12. ( ) NULKA OT-II -

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY
PROGRAM ELEMENT: 0604270N BUDGET ACTIVITY 4
PROGRAM ELEMENT TITLE: CONSOLIDATED EW PROGRAM
PROJECT NUMBER: WO638 PROJECT TITLE: AIRBORNE DEFENSIVE ECM

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0638		49,602	60,735	73,043	74,349	Cont.	Cont.

B. (U) DESCRIPTION: This project develops various Electronic Warfare (EW) equipments including Radar Warning Receivers (RWRs), Defensive Electronic Countermeasures (DECM), Infrared jammers (IR), expendable devices (flares, chaff and electronic expendables), laser warning receivers and missile warning equipments to increase aircraft survivability, and Soviet threat training simulators for use by the Fleet Electronic Warfare Support Group (FEWSG). Numerous laboratory EW efforts (hardware and software), improvements to existing EW systems, Infrared (IR) decoys, Electro-optical (EO) and laser countermeasures (CM), Electronic Warfare Software Support Activity (EWSSA), and system integration efforts are funded under this project.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:

a. (U) AAED-T, ASR, ALE-47: Continued FSED.

b. (U) APR-39(XE-2): Complete TECHEVAL.

c. (U) FEWSG: Continue AN/ALT-40 upgrade. Initiate FEWSG mission and TSD avionics upgrades.

d. (U) IR Decoy, IRCM, EOCM and Laser CM: Continue advanced development.

e. (U) RFCM: Continue technique development.

f. (U) SEWS: Development terminated.

g. (U) GEN-X: TECHEVAL is complete, commence OPEVAL.

h. (U) ASPJ: Commence Pre-Planned Product Improvement (P^3I) engineering development program.

i. (U) BOL CHAFF: Complete Foreign Weapons Evaluation (FWE), TECHEVAL and start OPEVAL.

j. (U) Complete squib design and test multichaff.

k. (U) EWSSA: Continue Software development.

l. (U) AAR-47 P^3I: Commence development of software update.

2. (U) FY 1991 PROGRAM:

a. (U) AAED-T, ASR, IDAP, GEN-X: Continue FSED.

b. (U) GEN-X and BOL CHAFF: Complete OPEVAL.

c. (U) APR-39A(XE-2): Conduct OPEVAL and procurement decision.

d. (U) FEWSG: Continue Upgrade of AN/ALT-40. Continue FEWSG Mission and TSD Avionics Upgrades.

e. (U) IR Decoys, IRCM, and Laser CM: Continue advanced dvelopment.

f. (U) ALE-47: Conduct TECHEVAL on F/A-18C and HH-60H.

g. (U) BOL CHAFF: Complete OPEVAL and procurement decision.

h. (U) RFCM: Continue technique development.

i. (U) EWSSA: Continue software development.

j. (U) AAR-47 P^3I: Continue development of software update.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY
PROGRAM ELEMENT: 0604270N BUDGET ACTIVITY 4
PROGRAM ELEMENT TITLE: CONSOLIDATED EW PROGRAM
PROJECT NUMBER: WO638 PROJECT TITLE: AIRBORNE DEFENSIVE ECM

k. (U) ALQ-164: Conduct/Complete OPEVAL.
l. (U) EOCM: Development terminated.

3. (U) FY 1992 PLANS:
a. (U) ASR: Continue FSED.
b. (U) FEWSG: Continue FEWSG Mission and TSD Avionics Upgrades. Complete ALT-40 Upgrade program.
c. (U) IR Decoys, IRCM, and Laser CM: Continue advanced development.
d. (U) ALE-47: Conduct F/A-18C and HH-60H OPEVAL and procurement decision (Milestone IIIA). Conduct Follow-on Operational Test & Evaluation (FOT&E) and Full Rate Production Decision (Milestone IIIB).
e. (U) RFCM: Continue technique development.
f. (U) EWSSA: Continue software development.
g. (U) AAR-47 P^3I: Complete DT/OT FY92/4Q of software update.
h. (U) AAED-T, IDAP: MS-IIIA LRIP FY92/4Q.
i. (U) ASPJ P^3I: Continue P^3I FSED.

4. (U) FY 1993 PLANS:
a. (U) AAED-T, ASR, IDAP: Continue FSED.
b. (U) FEWSG: Continue FEWSG Mission and TSD Avionics Upgrades.
c. (U) IR Decoys, IRCM, and Laser CM: Continue advanced development.
d. (U) RFCM: Continue technique development.
e. (U) STRAP: Commence FSED program.
f. (U) F/A-18 IDAP: Commence FSED Program.
g. (U) ASPJ P^3I: Continue P^3I FSED.
h. (U) EWSSA: Continue software development.
i. (U) ALE-47: Continue FOT&E on various Navy aircraft.

5. (U) PROGRAM TO COMPLETION:
a. (U) ASPJ P^3I: Continue P^3I effort thru FY97 incorporating technique enhancement and performance improvements.
b. (U) FEWSG: Complete FEWSG Mission and TSD Avionics Upgrades.
c. (U) AAED-TOWED: Complete FSED/DT/OT/OPEVAL FY94/4Q.
d. (U) ASR: Complete FSED/DT/OT FY94/4Q.
e. (U) IDAP MD/BB: Complete FSED/DT/OT/OPEVAL FY94/4Q.
f. (U) RF LABS: This is a continuing program.
g. (U) LASER CM: This is a continuing program.
h. (U) IRCM: This is a continuing program.
i. (U) IR DECOYS: This is a continuing program.
j. (U) EWSSA: This is a continuing program.
k. (U) F/A-18 IDAP: Complete aircraft integration FY97.
l. (U) HELO JAM SUITE: This is a continuing effort.
m. (U) STRAP: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: COMPACMISTESTCEN, Point Mugu, CA; NAVAIRTESTCEN, Patuxent River, MD; NAVAVIONICCEN, Indianapolis, IN; NAVWPNSCEN, China Lake, CA; NRL, Washington, DC; NAVAIRDEVCEN, Warminster, PA; NAVWPNSUPPCEN, Crane, IN; NAVAIRPROPCEN, Trenton, NJ. CONTRACTORS: Grumman Aerospace, Bethpage, NY; Sanders Associates, Nashua, NH; Raytheon, Goleta, CA; Westinghouse, Baltimore, MD; ITT, Nutley, NJ; Tracor Aerospace, Austin, TX; Loral Iris, Lexington, MA.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY
PROGRAM ELEMENT: 0604270N BUDGET ACTIVITY 4
PROGRAM ELEMENT TITLE: CONSOLIDATED EW PROGRAM
PROJECT NUMBER: WO638 PROJECT TITLE: AIRBORNE DEFENSIVE ECM

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
1. (U) TECHNOLOGY CHANGES: N/A
2. (U) SCHEDULE CHANGES: The FY 1991 reduction resulted in termination of Electro-Optical countermeasures development and deletion of ASPJ P^3I.
3. (U) COST CHANGES: None.

F. (U) PROGRAM DOCUMENTATION:
1. (U) The following programs have current and approved Operational Requirement, Test & Evaluation Plans, or Navy Decision Coordination Proposals: AAED, ASR, IDAP, GEN-X, AAR-47, BOL, FEWSG, ASPJ P^3I and APR-39A(XE-2).

G. (U) RELATED ACTIVITIES: Joint Service programs: APR-39A(XE-2), AVR-2, ALE-47, ALQ-162, AAR-47.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
1. (U) PROCUREMENT						
a. (U) APN-1	42,299	30,270	24,793	30,977	Cont.	Cont.
b. (U) APN-5	46,818	103,017	100,944	124,938	Cont.	Cont.
c. (U) APN-6	3,455	11,418	4,854	14,970	Cont.	Cont.
d. (U) OPN	35,080	38,912	71,354	51,177	Cont.	Cont.
e. (U) O&M,N	834	3,109	2,198	2,491	Cont.	Cont.
f. (U) MILCON	None	None	None	None	-	-

O&M,N funding for installations is under individual aircraft funding lines.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENT: BOL is an FWE project with Sweden.

J. (U) MILESTONE SCHEDULE:

	M/S II	M/S IIIA	M/S IIIB
1. (U) AAED	FY88/3Q	FY94/4Q	FY95/1Q
2. (U) ASR	FY87/2Q	FY93/2Q	FY93/4Q
3. (U) IDAP	FY88/3Q	FY94/4Q	FY95/1Q
4. (U) GEN-X	FY87/4Q	FY91/3Q	N/A
5. (U) APR-39A(XE-2)	-------	FY91/3Q	N/A
6. (U) AVR-2	-------	-------	FY90/1Q
7. (U) BOL Chaff	-------	FY91/3Q	N/A
8. (U) ALE-47	-------	FY92/1Q	FY92/4Q

FY 1992/3 OSD/OMB RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604270N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: CONSOLIDATED EW PROGRAM
PROJECT NUMBER: W0556 PROJECT TITLE: EA-6B ADVANCED CAPABILITY (ADVCAP)
POPULAR NAME: EA-6B ADVANCED CAPABILITY (ADVCAP)



A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	TO COMPLETE
Program Milestones	1ST FLIGHT 10/89		IIIA 3/92		N/A
Engineering Milestones	PHASE II SOFTWARE DEV	ONGOING	ONGOING		N/A
T&E Milestones	DEVELOPMENTAL TEST	OT-IIA 9/91	-		
Contract Milestones			LIMITED PRODUCTION 3/92		

BUDGET ($K)	FY 1990	FY 1991	FY 1992	FY 1993	Program Total
Major Contract	$ 2,450	$ 5,200	$ 9,090	$13,780	$304,000
Support Contract	$ 268	$ 250	$ 250	$ 250	$ 13,000
In-House Support	$10,111	$ 6,036	$14,684	$18,896	$335,200
GFE/ Other	-	-	-	-	
TOTAL	$12,829	$11,486	$24,024	$32,926	$652,200

FY 1992/3 OSD/OMB RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604270N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: CONSOLIDATED ELECTRONIC WARFARE
PROJECT NUMBER: W0556 PROJECT TITLE: EA-6B ADVANCED CAPABILITY (ADVCAP)

B. (U) DESCRIPTION: The EA-6B Weapon System is designed for jamming and destruction of enemy landbased, shipborne and airborne command, control and communications (C3) and radars associated with early warning, target acquisition, surveillance, anti-aircraft artillery, and air-to-surface, surface-to-surface and surface-to-air missiles. In this capability, it will support carrier based tactical aircraft and battle group operations in dense radar controlled environments. The efforts under this program element provide for the electronic countermeasure response to these advanced threat weapon systems and C3 networks which are expanding in frequency, density and technical complexity. This program element funds the continuing development and/or integration of all Electronic Warfare (EW) systems for the EA-6B Electronic Countermeasures Support Aircraft and includes enhancements to the air vehicle to accommodate these EW improvements. Major efforts include the development and integration into the EA-6B of a new Advanced Capability (ADVCAP) Receiver Processor Group (RPG), a communications and radar countermeasures set (AN/ALQ-149), a Universal Exciter Upgrade (UEU), a Coherent Countermeasures (COCM) Capability and a Band 2/3 Transmitter.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

a. (U) Conduct reliability development and weapon replaceable assembly maintainability demonstration for the ALQ-149.

b. (U) Continue software development, system integration, logistics support development and test aircraft final assembly for the RPG and ALQ-149.

c. (U) Conduct contractor flight tests in support of the RPG and ALQ-149.

d. (U) Continue production HARM Block III/IV integration.

e. (U) Conduct contractor and Navy Developmental Testing on HARM Block III/IV.

f. (U) Conduct Navy Preliminary Evaluation of the RPG and ALQ-149.

2. (U) FY 1991 Program:

a. (U) Complete qualification, RDT and EMI testing on RPG.

b. (U) Deliver the final EA-6B ADVCAP RPG EDM.

c. (U) Conduct developmental and operational testing to support RPG and ALQ-149 Milestone IIIA decision.

d. (U) Continue integration of RPG and ALQ-149 on the EA-6B.

e. (U) Continue software development and logistics support development for the RPG and ALQ-149.

f. (U) Complete contractor integration and test of Band 2/3 system.

g. (U) Commence the Universal Exciter Upgrade (UEU) Program.

h. (U) Complete Navy Developmental and Operational Flight Testing on HARM Block III/IV.

i. (U) Begin a Coherent Countermeasure Program for the EA-6B.

FY 1992/3 OSD/OMB RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604270N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: CONSOLIDATED ELECTRONIC WARFARE
PROJECT NUMBER: W0556 PROJECT TITLE: EA-6B ADVANCED CAPABILITY (ADVCAP)

3. (U) FY 1992 PLANS:
a. (U) Complete contractor acceptance test for Band 2/3.
b. (U) Complete delivery of Band 2/3 EDM's 1 through 5.
c. (U) USN to complete Band 2/3 qualification, EMI and RDT testing.
d. (U) Conduct Band 2/3 maintenance demonstration and complete TECHEVAL/OPEVAL to support Milestone III decision.
e. (U) Continue software development and logistics support development for the RPG and ALQ-149.
f. (U) Continue software Phase II development for RPG and ALQ-149.
g. (U) Continue integration of the RPG and ALQ-149 on the EA-6B.
h. (U) Continue the Universal Exciter Upgrade (UEU) Program.
i. (U) Continue the COCM Program.

4. (U) FY 1993 PLANS:
a. (U) Continue software development and logistics support development for the RPG and ALQ-149.
b. (U) Continue software Phase II development for RPG and ALQ-149.
c. (U) Continue integration of the RPG and ALQ-149 on the EA-6B.
d. (U) Deliver five Universal Exciter Upgrade EDMs and continue software integration, laboratory integration and testing.
e. (U) Continue COCM program for the EA-6B.
f. (U) Continue the Universal Exciter Upgrade (UEU) Program.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: PMTC, Point Mugu, CA; NATC, Patuxent River, MD; NWC, China Lake, CA; NRL, Washington, DC; NAPC, Trenton, NJ; NADC, Warminster, PA; NAC, Indianapolis, IN; and NWSC, Crane, IN; COMOPTEVFOR, Norfolk, VA. CONTRACTORS: Grumman Aircraft Systems Division, Bethpage, NY; Raytheon Corporation, Goleta, CA; Pratt and Whitney, West Palm Beach, FL; Sanders Associates, Nashua, NH; Texas Instruments, Ridgecrest, CA.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: The technology that will be incorporated into the Universal Exciter Upgrade will satisfy the Communication/Radar Exciter and ALQ-149 interface requirements.

2. (U) SCHEDULE CHANGES: Milestone IIIA (LRIP decision) for the RPG and ALQ-149 is now FY 1992/2Q.

3. (U) COST CHANGES: None.

FY 1992/3 OSD/OMB RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604270N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: CONSOLIDATED ELECTRONIC WARFARE
PROJECT NUMBER: W0556 PROJECT TITLE: EA-6B ADVANCED CAPABILITY (ADVCAP)

F. (U) PROGRAM DOCUMENTATION: The ADVCAP NDCP was approved in September 1985. The ALQ-149/Universal Exciter Upgrade (UEU) NDCP was approved in FY 88/2Q. TEMP 604 has been consolidated into the RPG TEMP (157-10 Revision 2) along with the UEU and Band 2/3 Transmitter. This will be the EA-6B ADVCAP TEMP and will address each of the individual R&D programs. The consolidated TEMP is in review with final approval expected in FY 91/1Q. EA-6B HARM integration (TEMP 1175) was approved in July 1989. TEMP 1175 will be consolidated into TEMP 591
Revision 4.

G. (U) RELATED ACTIVITIES: None.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
PROCUREMENT	$68,600	$349,376	$110,434	$510,456	Cont.	Cont.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

J. (U) TEST AND EVALUATION: N/A

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604270N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: COUNTER COMMUNICATIONS
PROJECT NUMBER: X1794 PROJECT TITLE: COUNTER COMMUNICATIONS

C. (U) DESCRIPTION: This project funds prototyping of carry-on systems to replace the SSQ-74 Van Cover and Deception (C&D) systems currently deployed with Fleet Deception Groups. The vans have been identified as detrimental to C&D efforts, impacting limited deck space on small combatants and unable to deploy on certain class warships due to Radar Cross Section (RCS) and weight and moment restrictions. New capability will be installed internally in the ship. The prototype system will be open architecture, able to simulate any radar within its radio frequency coverage through a computer controlled modulation system. Initial operations will include a capability to simulate the two radars identified by the C&D program sponsor.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS: N/A

E. (U) WORKED PERFORMED BY: IN-HOUSE: NSWC Dahlgren, VA. CONTRACTORS: TBD

F. (U) RELATED ACTIVITIES: N/A

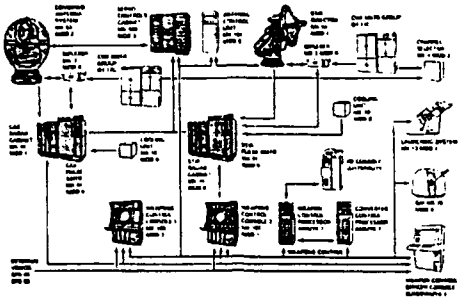
G. (U) OTHER APPROPRIATION FUNDS: (Dollars In Thousands)

	FY 90 ACTUAL	FY 91 EST	FY 92 EST	FY 93 EST	TO COMPLETE	TOTAL PROGRAM
OPN (ICADS)	3696	3559	3368	2174	8137	20934

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: N/A

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0604301N **Budget Activity:** 4
Program Element Title: MK 92 FCS Upgrade
Project Number: S0179 **Project Title:** MK 92 FCS Upgrade
Popular Name: CORT



A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousand

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	To Complete
PROGRAM MILESTONES		IIIB 7/91			
ENGINEERING MILESTONES			MID-LIFE CODR		
T&E MILESTONES		DT-IID/ OT-IIB			
CONTRACT MILESTONES					

BUDGET ($K)	FY 1990	FY 1991	FY 1992	FY 1993	Prog. Total To Complete
MAJOR CONTRACT	600	2,170	1,000	1,000	Cont.
SUPPORT CONTRACT	350	1,300	650	650	Cont.
IN-HOUSE SUPPORT	1,650	3,400	262	245	Cont.
GFE/ OTHER	387	463	100	100	Cont.
TOTAL	2,987	7,333	2,012	1,995	Cont.

Program Element: 0604301N **Budget Activity:** 4
Program Element Title: MK 92 FCS Upgrade
Project Number: S0179 **Project Title:** MK 92 FCS Upgrade
Popular Name: CORT

B. (U) DESCRIPTION: This program element supports integration and testing of improvements to the FCS MK 92 Mod 2 and the FCS Mk 92 Mod 6 Coherent Receiver Transmitter (CORT) upgrade. Beginning in FY 1992, the program will also include system engineering, integration and testing of all components of the FFG 7 class Anti-Ship Missile Defense (ASMD) mid-life upgrade.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

   a. (U) Completed development and land based testing of improvements for the MK 92 MOD 6 to enhance system performance in the presence of heavy sea clutter.

   b. (U) Initiated test plans and procedures to conduct DT/OT aboard FFG 61.

   c. (U) Initiated IDS documentation for FFG 61 baseline.

2. (U) FY 1991 Program:

   a. (U) Conduct DT-II and OPEVAL testing aboard FFG 61.

   b. (U) Analyze data from DT-II/OT and initiate correction of any deficiencies noted in testing.

   c. (U) Begin re-compile of the FCS MK 92 MOD 6 computer program.

   d. (U) Commence detailed study of SM-2 Block 3B applicability for the FFG's.

   e. (U) Initiate embedded trainer development.

3. (U) FY 1992 Plans:

   a. (U) Commence development of modifications to correct deficiencies noted in DT/OT in FFG 61.
   b. (U) Continue investigation of SM-2 Block 3B applicability.
   c. (U) Continue embedded trainer development.
   d. (U) Certify the FCS MK 92 MOD 6 computer program.
   e. (U) Continue development of Mk 92 Mod 2 tactical improvements, including Guard Gate, Priority Engage and Sector Scan.

Program Element: 0604301N **Budget Activity:** 4
Program Element Title: MK 92 FCS Upgrade
Project Number: S0179 **Project Title:** MK 92 FCS Upgrade
Popular Name: CORT

f. (U) Continue development of Mk 92 Mod 2 technical improvements, including testing and integration of a heavy duty transmission for Combined Antenna System (CAS) and reduction of high failure rate items.
g. (U) Develop low Radar Cross Section (RCS) CAS/STIR improvements.
h. (U) Continue SYS/IADT casualty improvements (ATI).

4. (U) FY 1993 Plans:

a. (U) Continue investigation of SM-2 Block 3B applicability.
b. (U) Continue embedded trainer development.
c. (U) Certify the FCS MK 92 MOD 6 computer program.
d. (U) Continue development of Mk 92 Mod 2 tactical improvements.
e. (U) Continue development of Mk 92 Mod 2 technical improvements.
f. (U) Continue development of low RCS CAS/STIR improvements.
g. (U) Begin Electro Optic improvements for STIR.
h. (U) Initiate Low 'E' Continuous Wave Illuminator (CWI) improvements.

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY:

IN-HOUSE: COMOPTEVFOR, Norfolk, VA;
NAVSHIPWPNSYSENGSTA, Port Hueneme, CA.
PACIFIC MISSILE TEST CENTER, Point Mugu, CA

CONTRACTOR: UNISYS Corporation, Great Neck, NY;
Johns Hopkins University, Applied Physic Laboratory, Laurel, MD;
Vitro Corporation, Silver Spring, MD.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) TECHNICAL CHANGES: N/A

2. (U) SCHEDULE CHANGES: N/A

3. (U) COST CHANGES: The increase of $3968 in FY91 supports the CNO project 107-2 DT/OT events to support milestone IIIB decision.

F. (U) PROGRAM DOCUMENTATION: TEMP 107-2

G. (U) RELATED ACTIVITIES: Not applicable.

Program Element: 0604301N Budget Activity: 4
Program Element Title: MK 92 FCS Upgrade
Project Number: S0179 Project Title: MK 92 FCS Upgrade
Popular Name: CORT

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990	FY 1991	FY 1992	FY 1993	Total To Complete
(U) OPN#34540900	0	0	48,922	55,534	Cont.
(U) OPN#34520800	15,683	14,971	12,339	13,727	Cont.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: Not applicable.

FY 1992/93 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604303N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AEGIS AREA AIR DEFENSE
PROJECT NUMBER: S1776 PROJECT TITLE: AEGIS WEAPON SYSTEM MODS

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1776	AWS MODS	12,633	11,609	7,902	7,523	Cont.	Cont.

B. (U) DESCRIPTION: This program provides for modifications to the AEGIS Weapon System MK-7 and integration of the MK 41 Vertical Launching System (VLS) to counter the threat (Naval Technical Intelligence Center (NTIC) Threat Assessment #012-88 of June 88).

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:
1. (U) FY 1990 ACCOMPLISHMENTS:
   a. (U) Completed testing of AN/SPY-1A signal processor ORDALTS.
   b. (U) Completed final integration testing and delivery of Nuclear Certified Vertical Launching System (VLS) AN/UYK-44 computer programs.
   c. (U) Conducted engineering development of SPY-1 Electronic Counter Countermeasures (ECCM) Improvements.
2. (U) FY 1991 PROGRAM:
   a. (U) Conduct engineering development and testing of SPY-1 ECCM improvements.
   b. (U) Build SPY-1B/D signal processor ECCM changes and test.
3. (U) FY 1992 PLANS:
   a. (U) Conduct testing of SPY-1 ECCM improvements.
   b. (U) Start development and engineering of SPY-1B improvements in addition to ECCM.
4. (U) FY 1993 PLANS:
   a. (U) Conduct first unit checkout of SPY-1 ECCM improvements.
   b. (U) Conduct engineering development of SPY-1B and Operational Readiness Test System man-machine interface improvements.
   c. (U) Start development and engineering of SPY-1B(V)/D upgrades.
5. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN HOUSE: NSWC, Dahlgren, VA; NSWSES, Port Hueneme, CA; NWS, Concord, CA; and NAVSUP, Washington, D.C. CONTRACTORS: General Electric, Moorestown, NJ; Raytheon Corporation, Wayland, MA; Techmatics, Arlington, VA; and Martin Marietta, Baltimore, MD. OTHERS: Department of the Interior, Washington, D.C.

E. (U) RELATED ACTIVITIES:
- Program Element 0604307N, AEGIS Combat System Engineering, provides engineering development for the CG 47 and DDG 51 Combat System.
- Program Element 0603382N, Battle Group Anti-Air Warfare Coordination (BGAAWC), develops techniques and equipment for better coordinated Battle Group AAW defense.

F. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

		FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U)	PROCUREMENT						
(U)	OPN LI5246	42,148	54,380	47,222	192,008	Cont.	Cont.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

FY 1992/93 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604307N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AEGIS COMBAT SYSTEM ENGINEERING

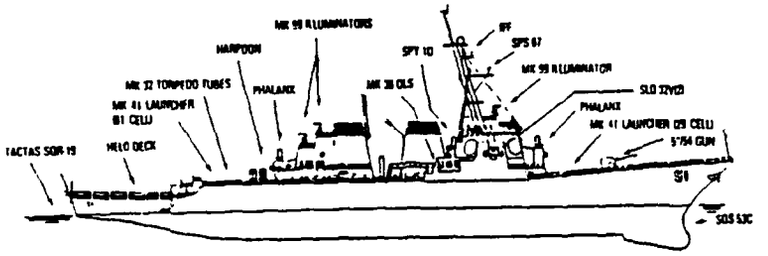
A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1337	DDG C/S ENG	30,750	33,867	41,993	35,332	Cont.	Cont.
S1447	C/S IMP	24,615	17,830	18,379	27,220	Cont.	Cont.
S1937	DDG WEAP DEV	0	39,436	31,781	30,117	32,274	166,308
	TOTAL	55,365	91,133	92,153	92,669	Cont.	Cont.

B. (U) DESCRIPTION: AEGIS Combat System will provide immediate and effective capability to counter the current and expected air, surface and sub-surface threats as articulated in Naval Technical Intelligence Center (NTIC) Threat Assessment #018-89 dated November 1989. Since the construction period of the ship classes extends into the 21st century, changes in the threat capability require corresponding Combat System changes. This program provides the Combat System engineering and selected weapons development necessary for such a continued increase in the capability of the AEGIS Combat System in AEGIS cruisers and destroyers. It will also allow later ships of these classes to take advantage of maturing equipments and weapons systems being developed in other Navy research and development programs so that battle effectiveness will be retained against the evolving threat.

FY 1992/93 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604307N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: AEGIS COMBAT SYSTEM ENGINEERING
PROJECT NUMBER: S1337 **PROJECT TITLE:** DDG C/S ENGINEERING



A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	TO COMPLETE
PROGRAM MILESTONES		IIIB			
ENGINEERING MILESTONES	EO3 10/89	DDG 51 SCT 2/91	B/L 5 PDR 11/91	B/L 6 SDR 12/92	
	B/4 PH II	B/L 5 SDR	B/L 5 CDR	B/L 6 PDR	
	CDR 2/90	5/91	6/92	9/93	
	ALO 3/90	B/L 4 PH II	SQT 7/91		
T&E MILESTONES	DT-IIB3 7/90	DT-IIIA 7/91	PSA 10/91	DT-IIIB 1/93	
	OT-IIB3 8/90	OT-IIIA 8/91		OT-IIIB 3/93	
		SPY-1D DT-IIE 7/91			
		SPY-1D OT-IIE 8/91			
CONTRACT MILESTONES	None	None	None	None	
BUDGET ($K)	FY 1990	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL TO COMPLETE
MAJOR CONTRACT	24,574	28,033	34,958	28,651	Cont.
SUPPORT CONTRACT	210	210	210	210	Cont.
IN-HOUSE SUPPORT	4,602	4,849	6,050	5,696	Cont.
GFE/ OTHER	1,364	775	775	775	Cont.
TOTAL	30,750	33,867	41,993	35,332	Cont.

B. (U) DESCRIPTION: This project provides for combat system design, engineering, integration and testing for DDG 51 class ships similar to the TICONDEROGA class and is the next orderly evolution of a proven system. The Combat System is derived from CG 47 Baselines 2 and 3 being developed in Project S1447, the major difference being the introduction of new computers and displays plus new elements developed under Project S1937. In turn, CG 47

PROGRAM ELEMENT: 0604307N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AEGIS COMBAT SYSTEM ENGINEERING
PROJECT NUMBER: S1337 PROJECT TITLE: DDG C/S ENGINEERING

Baseline 4 will benefit directly from most of the computer program and technical documentation developed for DDG 51. A Combat System prototype for DDG 51 was installed at the Combat System Engineering Development Site (CSEDS), Moorestown, NJ, for system engineering, validation, element level and system level test of computer programs and equipment. Also planned improvements/modification to the Destroyer Combat System will be developed and integrated as Baseline 5 Upgrades to include Joint Tactical Information Distribution System (JTIDS)/Command and Control Processor (C2P), TADIL J, Combat Direction Finding (DF), Tactical Data Information Exchange System (TADIX B), SLQ-32(V)3 Active Electronic Countermeasures (ECM) and AEGIS Extended Range (ER) Missile. Further modifications planned as Baseline 6 Upgrades will include integration of the SPY-1 radar upgrades into the AEGIS Combat System.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:
   a. (U) Conducted major Combat System engineering test (EO-3)/SQT Baseline 4 at the Combat System Engineering Development Site.
   b. (U) Provided technical support required to conduct Developmental/Operational Tests (DT/OT-IIB-3) on the Baseline 4 Combat System.
   c. (U) Conducted Combat System Light-off in ARLEIGH BURKE. Continued final Destroyer Combat System checkout and testing.
   d. (U) Commenced system engineering to integrate the AN/SPS-67(V)3, Anti-Submarine Warfare (ASW) Onboard Trainer and TOMAHAWK Weapon System (TWS) Trainer into the AEGIS Weapons System (Baseline 4 Phase II).
   e. (U) Conducted Critical Design Review (CDR) and commenced coding of AN/SPS-67(V)3, ASW Onboard Trainer and TWS Trainer capabilities.
   f. (U) Began system engineering to integrate AEGIS ER, JTIDS/C2P/TADIL J, TADIX B, SLQ-32(V)3 Electronic Warfare System and Combat DF into AEGIS Combat System (Baseline 5).

2. (U) FY 1991 PROGRAM:
   a. (U) Transfer ship custody of ARLEIGH BURKE (DDG 51).
   b. (U) Complete coding and commence system testing of AN/SPS-67(V)3, ASW Onboard Trainer and TWS Trainer into AEGIS Combat System (Baseline 4 Phase II).
   c. (U) Conduct Preliminary Design Review (PDR), commence design specifications and conduct CDR for integration of AEGIS ER into the AEGIS Weapon System as part of Baseline 5.
   d. (U) Conduct System Design Review (SDR) and commence design specifications for the integration of JTIDS/C2P/TADIL J, TADIX B, SLQ-32(V)3 and Combat DF into the AEGIS Weapon System (Baseline 5).
   e. (U) Conduct SPY-1D Technical and Operational Evaluation (TECHEVAL/OPEVAL) (DT/OT-IIE) in ARLEIGH BURKE.

PROGRAM ELEMENT: 0604307N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AEGIS COMBAT SYSTEM ENGINEERING
PROJECT NUMBER: S1337 PROJECT TITLE: DDG 51 C/S SYSTEM ENGINEERING

3. (U) FY 1992 PLANS:
   a. (U) Complete system testing of Baseline 4 Phase II elements.
   b. (U) Complete code, debugging and testing for AEGIS ER integration into the AEGIS Weapon System at the CSED Site.
   c. (U) Conduct PDR/CDR to integrate Baseline 5 into the Combat System.
   d. (U) Begin coding, debugging and testing and commence design specifications for integration of Baseline 5 Upgrades into the AEGIS Weapon System.
   e. (U) Conduct engineering development to integrate the SPY-1 radar upgrades (Baseline 6) into the AEGIS Combat System.

4. (U) FY 1993 PLANS:
   a. (U) Conduct system demonstration of AEGIS ER integration into the AEGIS Weapon System.
   b. (U) Complete coding, debugging and testing of Baseline 5 Upgrades and start integration and testing at the CSED Site.
   c. (U) Conduct SDR and PDR and commence design specifications for Baseline 6 Combat System Upgrades and continue system engineering to integrate these upgrades into the AEGIS Combat System.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NOSC, San Diego, CA; Naval Electronic Systems Engineering Agent, St. Inigoes, MD; NSWC, Dahlgren, VA; NUSC, New London, CT; Fleet Analysis Center, Corona, CA; PMTC, Pt. Mugu, CA; and NRL, Washington, D.C. CONTRACTORS: General Electric, Moorestown, NJ; Raytheon Corporation, Wayland, MA; and General Electric, Syracuse, NY. OTHERS: Johns Hopkins University, Applied Physics Laboratory, Laurel, MD; Rockwell International Corporation, Autonetics Marine Systems Division, Arlington, VA; and Sperry Corporation, Minneapolis, MN.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) Technology Changes: The SLQ-32(V)3 Electronic Warfare System, approved by a Program Management Proposal (PMP) signed 22 November 1989, is included in Baseline 5. Engineering development for Baseline 6 Upgrades begins in FY 1991.
2. (U) Schedule Changes: Time spent in FY 1990 on Baseline 4 Phase II design specifications extended.
3. (U) Cost Changes: None.

F. (U) PROGRAM DOCUMENTATION:

TLR, Rev 1, Chg 1	8/85
TEMP 801, Rev 3	7/86
NDCP 1337, Rev 1, Chg 1	9/86
NTPS-30-8511A	9/87
TEMP 801, Rev 4	5/89
Acq Plan 166-86, Rev B, Chg 6	12/89
TEMP 801, Rev 5 (in process)	In OSD for approval (12/90)

PROGRAM ELEMENT: 0604307N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AEGIS COMBAT SYSTEM ENGINEERING
PROJECT NUMBER: S1337 PROJECT TITLE: DDG 51 C/S SYSTEM ENGINEERING

G. (U) RELATED ACTIVITIES:

- Program Element 0604355N, Vertical Launch Anti-Submarine Rockets, develops the Anti-Submarine Rockets.
- Program Element 0604574N, AN/SQS-53C, develops the Anti-Submarine Warfare sonar.
- Program Element 0604303N, AEGIS Area Air Defense, provides for modifications to the AEGIS Weapon System and integration of the Vertical Launching System.
- Program Element 0604366N, STANDARD MISSILE Improvements, relates to missile development for the AEGIS Weapon System.
- Program Element 0603382N, Battle Group Anti-Air Warfare Coordination, develops techniques and system initialization to better coordinate Battle Group Anti-Air Warfare defense.
- Program Element 0603318N, AEGIS ER, develops an extended range surface-to-air missile for AEGIS ships with Vertical Launching Systems.

H. (U) OTHER APPROPRIATION FUNDS (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT:						
(U) SCN LI2122	3,451,328	3,322,493	3,546,088	3,588,760	Cont.	Cont.
(U) QUANTITY	(5)	(4)	(4)	(4)		
(U) OPN LI5246	42,148	54,380	47,222	192,008	Cont.	Cont.
(U) O&M,N	135,646	173,992	207,370	223,656	Cont.	Cont.
(U) MILCON	0	5,400	0	10,700	Cont.	Cont.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: This information is included in the FY 1992 Congressional Data Sheets.

FY 1992\93 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604307N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AEGIS COMBAT SYSTEM ENGINEERING
PROJECT NUMBER: S1447 PROJECT TITLE: COMBAT SYSTEM IMPROVEMENTS

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETION	TOTAL PROGRAM
S1447 C/S IMP	24,615	17,830	18,379	27,220	Cont.	Cont.

B. (U) DESCRIPTION: The baseline AEGIS Combat System was developed under Program Element 0604304N, Combat System Engineering Development, and was introduced into the fleet in USS TICONDEROGA in 1983. The system is a set of integrated elements used to conduct anti-air, anti-surface, anti-submarine, and strike warfare effectively in both clear and adverse environments. Through the use of the core of the Combat System —the AEGIS Weapon System (AWS) — a number of weapons including surface-to-air and surface-to-surface missiles, close-in weapons, gun systems, anti-submarine weapons, and aviation systems are integrated to operate in multi-mission battle environments. This project provides upgrades to integrate new equipments and systems to maintain pace with the threat. Three major improvements have been approved which are engineered as separate Baselines; Baseline 2 (CG 52-58) consists of the Vertical Launching System, TOMAHAWK Weapon System (TWS), and Anti-Submarine Warfare (ASW) upgrades. Baseline 3 (CG 59-64) includes the AN/SPY-1B radar and AN/UYQ-21 consoles. Baseline 4 (CG 65-73) converts computer programs for use in AN/UYK-43/44 computers and provides increased Battle Group capability in the AEGIS Display System. Engineering development of Baseline 7 upgrades for the DDG 51 class will begin in FY 1992. This program is in response to the NTIC Threat Assessment #018-89 dated November 1989.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:
   a. (U) Conducted Baseline 4 major engineering test (EO-3) at the Combat System Engineering Development (CSED) Site.
   b. (U) Started shipyard testing of Baseline 4 Combat System.
   c. (U) Provided technical support required to conduct Developmental/Operational Tests (DT/OT-IIB3) on the Baseline 4 Combat System.
   d. (U) Began detailed design of AEGIS Display System (ADS) force doctrine and Over-the-Horizon Targeting (OTH-T) upgrades.
   e. (U) Commenced systems engineering to integrate AN/SPS-49(V)7, MK 86 Air Gun Mode and TWS/AWS Integrated Training (Baseline 4 Phase II) into the Combat System.
   f. (U) Conducted Critical Design Review (CDR) and commenced coding of Baseline 4 Phase II upgrades.

2. (U) FY 1991 PROGRAM:
   a. (U) Ship Custody Transfer of CG 65, conduct Baseline 4 Phase II demonstration and System Qualification Tests (SQT).
   b. (U) Integrated and test AEGIS Display System force doctrine and OTH-T upgrades (ADS A4) will be integrated and tested.

PROGRAM ELEMENT: 0604307N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AEGIS COMBAT SYSTEM ENGINEERING
PROJECT NUMBER: S1447 PROJECT TITLE: COMBAT SYSTEM IMPROVEMENTS

c. (U) Complete coding, debug, and begin testing of AN/SPS-47(V)7 and MK 86 Gun mode (Baseline 4 Phase II upgrades).
d. (U) Conduct Baseline 4 Phase II demonstration at the CSED Site.

3. (U) FY 1992 PLANS:
a. (U) Complete integration and testing of Baseline 4 Phase II upgrades.
b. (U) Start engineering development for planned AEGIS Baseline upgrades: conversion of the Fire Control System to 60Hz power supplies, upgrades to the Identification Friend or Foe (IFF) system, Block III upgrades to the SQY-1 ASW Combat system, Surface Ship Torpedo Defense Phase II, Integrated Anti-Surface Missile Defense, and the application of new technology.

4. (U) FY 1993 PLANS:
a. (U) Conduct System Design Review (SDR) for planned Baseline upgrades.
b. (U) Conduct engineering development of planned Baseline upgrades.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NOSC, San Diego, CA; NESEA, St. Inigoes, MD; NSWC, Dahlgren, VA; NUSC, New London, CT; FAC, Corona, CA; PMTC, Pt. Mugu, CA; and NRL, Washington D.C. CONTRACTORS: General Electric, Moorestown, NJ; Raytheon, Wayland, MD; and General Electric, Syracuse, NY. OTHERS: Johns Hopkins University, APL, Laurel, MD; Rockwell International Corp., Autonetics Marine Systems Division, Arlington, VA; and Sperry, Minneapolis, MN.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) Technology changes: None
2. (U) Schedule changes: DT/OT-IIB3 added in July/August 1990.
3. (U) Cost changes: Funding increased $3,618 ($ in thousands) to support STANDARD Missile (SM-2) integration.

F. (U) PROGRAM DOCUMENTATION:

DCP-134	3/78 (except waiver ltr)
TLR, Rev 1, Chg 1	12/82
Ship ILS Plan 127-DD, Rev 2, Chg 7	9/87
NTP-30-7707B	2/88
TEMP 100, Rev 3	1/89
Acq Plan 166-86, Rev B, Chg 6	12/89

PROGRAM ELEMENT: 0604307N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AEGIS COMBAT SYSTEM ENGINEERING
PROJECT NUMBER: S1447 PROJECT TITLE: COMBAT SYSTEM IMPROVEMENTS

G. (U) RELATED ACTIVITIES:

- Program Element 0604355N, Vertical Launch Anti-Submarine Rockets, develops the Anti-Submarine Rockets for the AEGIS Combat System.
- Program Element 0604574N, AN/SQS-53C, develops the Anti-Submarine Warfare sonar for Baseline 4 Cruiser.
- Program Element 0604303N, AEGIS Area Air Defense, provides for modifications to the AEGIS Weapon System and integration of the Vertical Launching System.
- Program Element 0604366N, STANDARD MISSILE Improvements, relates to missile development for the AEGIS Weapon System.
- Program Element 0603382N, Battle Group Anti-Air Warfare Coordination, develops techniques and system initialization to better coordinate Battle Group Anti-Air Defense.
- Program Element 0603318N, AEGIS ER, develops an extended range surface-to-air missile for AEGIS ships with Vertical Launching Systems.

H. (U) OTHER APPROPRIATION FUNDS (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT:						
(U) SCN LI2122	3,451,328	3,322,493	3,546,088	3,588,760	Cont.	Cont.
(U) QUANTITY	(5)	(4)	(4)	(4)		
(U) OPN LI5246	42,148	54,380	47,222	192,008	Cont.	Cont.
(U) O&M,N	135,646	173,992	207,370	223,656	Cont.	Cont.
(U) MILCON	0	0	1,500	10,700	Cont.	Cont.

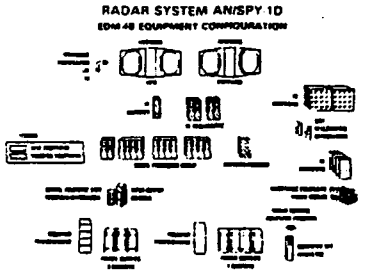
I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE:

1.	(U)	CG 65 delivered.	Nov 1990
2.	(U)	Conduct Baseline 4 Phase II Demo.	Jun 1991
3.	(U)	Complete integration and testing of Baseline 4 Phase II.	Mar 1992

FY 1992/93 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604307N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AEGIS COMBAT SYSTEM ENGINEERING
PROJECT NUMBER: S1937 PROJECT TITLE: DDG WEAPONS DEVELOPMENT



A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	TO COMPLETE
PROGRAM MILESTONES	None	IIIB	None	None	
ENGINEERING MILESTONES	None	DDG 51 SCT 2/91	EDM SDR 10/91	EDM PDR 10/92	
T&E MILESTONES	None	SPY-1D DT-IIE 7/91 SPY-1D OT-IIE 8/91	None	None	
CONTRACT MILESTONES	None	None	None	None	

BUDGET ($K)	FY 1990	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL TO COMPLETE
MAJOR CONTRACT	0	36,686	29,031	27,367	Cont.
SUPPORT CONTRACT	0	0	0	0	Cont.
IN-HOUSE SUPPORT	0	2,750	2,750	2,750	Cont.
GFE/ OTHER	0	0	0	0	Cont.
TOTAL	0	39,436	31,781	30,117	32,274 166,308

B. (U) DESCRIPTION: This program is required to develop selected systems and subsystems for the ARLEIGH BURKE (DDG 51) class ships. These developments involve elements of Anti-Air detection and fire control systems which are the state-of-the-art multi-function AEGIS Weapon System with its AN/SPY-1D phased array radar. This design and technology is based on the TICONDEROGA class AN/SPY-1B radar approved for production in 1986. Major changes are in the transmitter, power-supply and computer. This program responds to Naval Technical Intelligence Center (NTIC) validated Threat Assessment #018-89 dated November 1989.

PROGRAM ELEMENT: 0604307N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AEGIS COMBAT SYSTEM ENGINEERING
PROJECT NUMBER: S1937 PROJECT TITLE: DDG WEAPONS DEVELOPMENT

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS: Not applicable.

2. (U) FY 1991 PROGRAM: Begin development/design of radar upgrade (EDM-4B) approved by SECNAV 10/88 in PMP 88-03 and planned for introduction in an FY 95 Destroyer. Upgrades consist of computer programs and equipment modifications which will enhance capability against seaskimming target. A major equipment procurement will be made in FY 91.

3. (U) FY 1992 PLANS: Conduct System Design Review (SDR) for EDM-4B and start system engineering. A major equipment procurement will also be made in FY 92.

4. (U) FY 1993 PLANS: Conduct EDM-4B system engineering and conduct Preliminary Design Review (PDR). A major equipment procurement will also be made in FY 93.

5. (U) PROGRAM TO COMPLETION: Conduct EDM-4B Critical Design Review (CDR) in October 1993. Start EDM-4B equipment installation, checkout, integration and testing at the Combat System Engineering Development (CSED) Site and conduct demo.

D. (U) WORK PERFORMED BY: IN-HOUSE: NOSC, San Diego, CA; NESEA, St. Inigoes, MD; NSWC, Dahlgren, VA; NUSC, New London, CT; FAC, Corona, CA; PMTC, Pt. Mugu, CA; and NRL, Washington D.C. CONTRACTORS: General Electric, Moorestown, NJ; Raytheon, Wayland, MD; and General Electric, Syracuse, NY. OTHERS: Johns Hopkins University, APL, Laurel, MD; Rockwell International Corp., Autonetics Marine Systems Division, Arlington, VA; Sperry, Minneapolis, MN; and Technology Services Corp., Silver Spring, MD.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) Technology changes: None
2. (U) Schedule changes: None
3. (U) Cost Changes: None

F. (U) PROGRAM DOCUMENTATION:

TLR, Rev 1, Chg 1	8/85
TEMP 801, Rev 3	7/86
NDCP 1337, Rev 1, Chg 1	9/86
NTPS-30-8511A	9/87
PMP 88-03	10/88
TEMP 801, Rev 4	5/89
PMP 89-01	10/89
Acq Plan, 166-86, Rev B, Chg 6	12/89

PROGRAM ELEMENT: 0604307N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AEGIS COMBAT SYSTEM ENGINEERING
PROJECT NUMBER: S1937 PROJECT TITLE: DDG WEAPONS DEVELOPMENT

G. (U) RELATED ACTIVITIES:

- Program Element 0604355N, Vertical Launch Anti-Submarine Rockets, develops the Anti-Submarine Rockets for the AEGIS Combat System.
- Program Element 0604574N, AN/SQS-53C, develops the Anti-Submarine Warfare sonar for Baseline 4 Cruiser.
- Program Element 0604303N, AEGIS Area Air Defense, provides for modifications to the AEGIS Weapon System and integration of the Vertical Launching System.
- Program Element 0604366N, STANDARD MISSILE Improvements, relates to missile development for the AEGIS Weapon System.
- Program Element 0603382N, Battle Group Anti-Air Warfare Coordination, coordinates Battle Group Anti-Air Warfare defense.
- Program Element 0603318N, AEGIS ER, develops an extended range surface-to-air missile for AEGIS ships with Vertical Launching Systems.

H. (U) OTHER APPROPRIATION FUNDS (Dollars in Thousands)

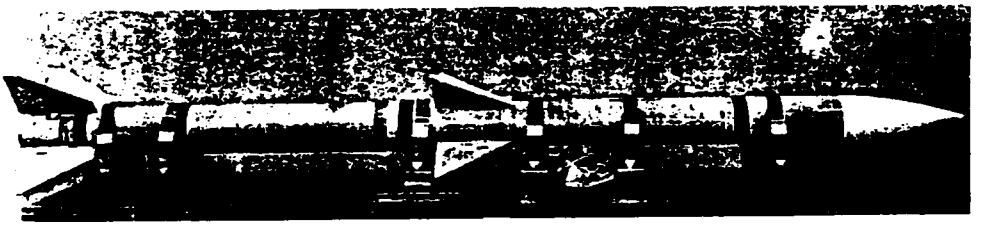
	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT:						
(U) SCN LI2122	3,451,328	3,322,493	3,546,088	3,588,760	Cont.	Cont.
(U) QUANTITY	(5)	(4)	(4)	(4)		
(U) OPN LI5246	42,148	54,380	47,222	192,008	Cont.	Cont.
(U) O&M,N	135,646	173,992	207,370	223,656	Cont.	Cont.
(U) MILCON	0	5,400	0	10,700	Cont.	Cont.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: Not applicable to this submission.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604314N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: ADVANCED MEDIUM RANGE AIR-TO-AIR MISSILE (AMRAAM)
PROJECT NUMBER: W0981 PROJECT TITLE: AMRAAM



POPULAR NAME: AMRAAM

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	TO COMPLETE
Program Milestones		DAB IIIB			
Engineering Milestones					
T&E Milestones	OT-IIIA 4Q/90 Navy	OT-IIIB 3Q/91 Navy			
Contract Milestones	LOT 4	LOT 5	LOT 6	LOT 7	Continuing
BUDGET ($K)	FY 1990	FY 1991	FY 1992	FY 1993	TO COMPLETE PROGRAM TOTAL
Major Contract					Continuing
Support Contract	524	600	330	360	Continuing
In-House Support	4,546	2,863	2,254	2,281	Continuing
GFE/ Other	1,863	115	109	115	Continuing
TOTAL	6,933	3,578	2,693	2,756	Continuing

PROGRAM ELEMENT: 0604314N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AMRAAM
PROJECT NUMBER: W0981 PROJECT TITLE: AMRAAM

B. (U) DESCRIPTION: This joint Navy/Air Force program is structured in response to the Joint Service Operational Require-ment and Mission Element Need statement to develop an air supe- riority air to air missile as a SPARROW follow-on with signifi- cant improvements in operational utility and combat effective- ness. This program supports the integration of the AMRAAM into Navy aircraft with analysis of Navy unique applications, simulation capability development, aircraft missile integration tasks, pre-planned product improvement efforts, and procurement of hardware to support Navy test and evaluation tasks.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:
1. (U) FY 1990 Accomplishments:
a. (U) Commenced operational testing (OT-IIIA)
b. (U) Completed OT-IIIB Planning
c. (U) Completed verification of F/A-18C/AMRAAM capability
d. (U) Continued refinement of missile performance (e.g. Electronic Counter Counter Measures (ECCM))
2. (U) FY 1991 Program:
a. (U) Complete operational testing (OT-IIIA)
b. (U) Continue refinement of missile performance and participate in follow-on AMRAAM improvement programs
c. (U) Continue F-14 integration planning efforts
d. (U) Initiate operational testing (OT-IIIB)
3. (U) FY 1992 Plans:
a. (U) Continue refinement of missile performance (e.g. ECCM)
b. (U) Participate in AMRAAM P3I program
c. (U) Continue F-14 integration activities
d. (U) Complete operational testing (OT-IIIB)
4. (U) FY 1993 Plans:
a. (U) Continue refinement of missile performance
b. (U) Participate in AMRAAM P3I program
c. (U) Continue F-14 integration activities
5. (U) Program to Completion: Navy R&D efforts on AMRAAM are continuing in order to participate with executive service follow-on efforts in P3I.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVWPNCEN, China Lake, CA, PACMISTESTCEN, Point Mugu, CA. CONTRACTORS: Hughes Aircraft Company, Canoga Park, CA, Raytheon Company, Bedford, MA. OTHERS: Air Force Development Test Center, Advanced Medium Range Air-to-Air Missile Joint System Program Office, Eglin, Air Force Base, FL.

Program Element: 0604314N Budget Activity: 4
Program Element Title: AMRAAM
Project Number: W0981 Project Title: AMRAAM

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
1. (U) Technology Changes: Not Applicable
2. (U) Schedule Changes: Not Applicable
3. (U) Cost Changes: None

F. (U) PROGRAM DOCUMENTATION:

JSOR	9/78	ILSP	7/89
MENS	11/78	DCP	6/87
MOU	8/80	TEMP	12/89

G. (U) RELATED ACTIVITIES: P.E. 0205667N, F-14 Squadrons; P.E. 0207130F,F-15 Squadrons; P.E. 0207133F, F-16 Squadrons; P.E. 0204136N, F/A-18 Squadrons. Other programs which are related to full employment capability include target identification and improved aircraft radar counter counter measures and aircraft multiple target track and missile guidance. Air Force P.E. 0604314F, Advanced Medium Range Air-to-Air Missile provided funding for full scale development contracts for this program. There is no unnecessary duplication of efforts with the Service/Agency or the Department of Defense.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE
(U) PROCUREMENT					
WPN/#7	101,885	279,801	205,981	140,786	Cont
(U) RDT&E, AF	10,800	25,500	30,700	31,100	Cont

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: The cooperative agreement signed by the U.S., the Federal Republic of Germany (FRG), and the United Kingdom (UK) in August 1980 provides for U.S. development and production of the Advanced Medium Range Air-to-Air Missile while FRG and UK are responsible for the development and production of the Advance Short Range Air-to-Air Missile (ASRAAM). All three nations are responsible for their respective aircraft integration work and the non-developing nation(s) may opt to purchase or co-produce the others' weapon. The FRG formally declared its intention to cease funding ASRAAM development thus terminating its membership. The future of the agreement is currently under discussion. The UK government, in partnership with British Aerospace, is currently completing a proposal to continue with the project using a combination of funds from the government and industry.

J. (U) TEST AND EVALUATION: See Congressional Data Sheets.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604354N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AIR-TO-AIR MISSILE SYSTEMS ENGINEERING

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0456	AIM-9	31,623	0	0	0	0	136,176
W1738	ASRAAM	36	0	0	0	0	36
	TOTAL	31,659	0	0	0	0	136,212

B. (U) DESCRIPTION: This program funds the upgrades required for various air-to-air missiles currently in inventory. Funds within Project W1738 covered ASRAAM administrative expenses, terminating in FY 1990.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604354N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AIR-TO-AIR MISSILE SYSTEMS ENGINEERING
PROJECT NUMBER: W0456 PROJECT TITLE: AIM-9M PIP (9R)

PICTURE NOT AVAILABLE

POPULAR NAME: SIDEWINDER

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	TO COMPLETE
Program Milestones					
Engineering Milestones	CDR 03/90				
T&E Milestones	DT-IIB 03/89-07/90 EM SHOTS 05/90				
Contract MILESTONES	Last Del EMs 11/90				

BUDGET ($K)	FY 1990	FY 1991	FY 1992	FY 1993	Program Total
Major Contract	14,360				58,960
Support Contract	300				6,800
In-House Support	16,963				70,416
GFE/ Other					
TOTAL	31,623				136,176

PROGRAM ELEMENT: 0604354N BUDGET ACTIVITY:4
PROGRAM ELEMENT TITLE: AIR-TO-AIR MISSILE SYSTEMS ENGINEERING
PROJECT NUMBER: W0456 PROJECT TITLE: AIM-9M PIP (9R)

B. ( ) DESCRIPTION: The AIM-9M Product Improvement Program, AIM-9R will upgrade the United States' forces with a superior air-to-air missile by increasing current head-on acquisition range, increasing background discrimination and increasing counter- countermeasures capability.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. (U) Continued Firing/Testing program
   b. (U) 1st Delivery of prime contractor hardware
   c. (U) Successful firing of contractor hardware
   d. (U) Program terminated.

2. (U) FY 1991 Program: Not applicable

3. (U) FY 1992 Plans: Not applicable

4. (U) FY 1993 Plans: Not applicable

5. (U) Program to Completion: Program terminates.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVWPCEN, China Lake, CA. CONTRACTOR: Ford Aerospace, Newport Beach, CA

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not Applicable

2. (U) Schedule Changes: Not Applicable.

3. (U) Cost Changes: Not Applicable.

Program Element: 0604354N Budget Activity: 4
Program Element Title: AIR-TO-AIR MISSILE SYSTEMS ENGINEERING
Program Number: W0456 Project Title: AIM-9M PIP (9R)

F. (U) PROGRAM DOCUMENTATION:
OR 2/86
TEMP 2/87

G. (U) RELATED ACTIVITIES: Not Applicable

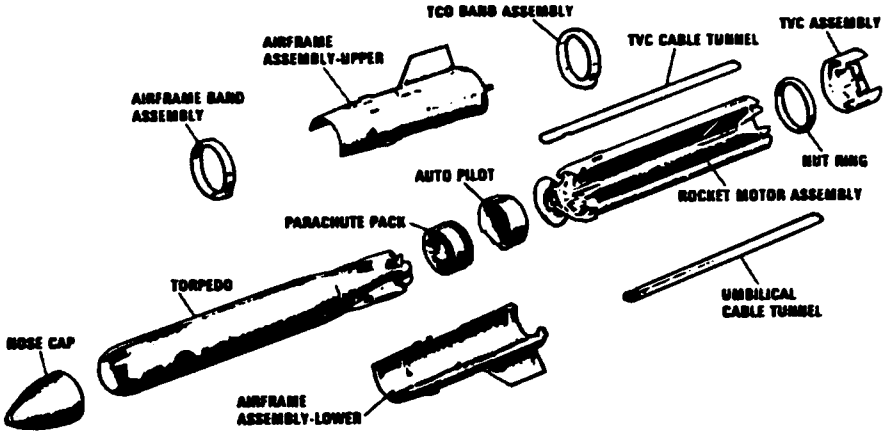
H. (U) OTHER APPROPRIATION FUNDS: Not Applicable

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable

J. (U) TEST AND EVALUATION: Not applicable for this submission.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604355N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Vertical Launch ASROC
PROJECT NUMBER: S1504 PROJECT TITLE: Vertical Launch ASROC
POPULAR NAME: VERTICAL LAUNCH ASROC (VLA)



A. ( ) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	TO COMPLETE	
Program Milestones		M/S IIIB 3/91			M/S III 1Q/FY98	
Engineering Milestones	Final Drawings 4/90	Start MK50 Design 4/91		CDR 4/94	PRR 3Q/96 ENG DWG 4Q/97	
T&E Milestones	OPEVAL 8/90			CTV Flight Tests 10/93	T/EVAL 1Q/97 O/EVAL 3Q/97	
Contract Milestones		Prod. Option 4/91, FSD 9/91			Prod Contract 3Q/98	
BUDGET ($K)	FY 1990	FY 1991	FY 1992	FY 1993	TO COMPLETE	PROGRAM TOTAL
Major Contract	1,350	10,312	28,417	26,391	30,050	191,730
Support Contract		418	388	384	934	2,124
In-House Support	1,559	2,465	6,748	8,803	23,041	132,860
GFE/Other	91	1,651	1,380	1,284	986	52,362
TOTAL	3,000	14,846	36,933	36,862	53,702	379,076

PROGRAM ELEMENT: 0604355N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Vertical Launch ASROC
PROJECT NUMBER: S1504 PROJECT TITLE: Vertical Launch ASROC

B. (U) DESCRIPTION: This program element provides for the design, development and testing of a replacement for the current Antisubmarine Rocket (ASROC) and modification to the Vertical Launching System MK 41 and affected fire control systems to permit launching Vertical Launch ASROC missiles from the Vertical Launching System in Class ships. The Vertical Launch ASROC missiles will provide an intermediate range, all-weather, quick-reaction, antisubmarine weapon delivery capability for ships equipped with the Vertical Launching System MK 41 and MK 116 Mod 6/7/8 Underwater Fire Control System. The program provides for design, development, test and integration of the MK 46 Mod 5 Torpedo and the MK 50 Torpedo (Commencing in FY91).

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. (U) Conducted OPEVAL (ten missile test firings of MK46 variant).

2. (U) FY 1991 Program:
   a. (U) Commence VLA (MK 50 variant) development effort by beginning prime item specification and interface documentation.
   b. (U) Begin MK 15 Canister design for VLA (Mk 50 variant) to isolate missile from shipboard shock.
   c. (U) Conduct M/S IIIB review (full production authorization) of VLA (Mk 46 variant) missile.
   d. (U) Execute production missile option for VLA (MK 46 variant) missile.
   e. (U) Begin fabrication of VLA MK 46/50 common components for FSD testing of the VLA (Mk 50 variant).

3. (U) FY 1992 Plans:
   a. (U) Award FSD contract to develop VLA (MK 50 variant).
   b. (U) Start design of modified canister for VLA (Mk 50 variant).
   c. (U) Start design of fire control system modifications for VLA (Mk 50 variant) missile.
   d. (U) Continue VLA (MK 50 variant) development effort.
   e. (U) Begin fabricating VLA (MK 50 variant) unique missile components.
   f. (U) Begin delivery of VLA (MK 46 variant) production units.

4. (U) FY 1993 Plans:
   a. (U) Begin early prototype/prequalification testing of VLA (Mk 50 variant) unique missile components.
   b. (U) Begin delivery of VLA (MK 50 variant) missile components.

PROGRAM ELEMENT: 0604355N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Vertical Launch ASROC
PROJECT NUMBER: S1504 PROJECT TITLE: Vertical Launch ASROC

c. (U) Begin development and qualification testing of VLA (MK 50 variant) missile and unique components.

d. (U) Complete delivery of MK46 variant production units.

5. (U) PROGRAM TO COMPLETION : This is a continuing program.

D. (U) WORK PERFORMED BY: In-house: NAVOCEANSYSCEN, San Diego, CA (lead lab); NAVSURFWPNCEN Dahlgren, VA; NAVSHIPWPNSYSENGSTA Port Hueneme, CA; NAVORDSTA Indian Head, MD; NWAC Corona, CA; WPNSTA EARLE Colt's Neck, NJ; Contractors: Loral Defense Systems-Akron, OH; Martin Marietta Baltimore, MD; FMC, Minneapolis, MN; Thiokol Inc., Elkton, MD.

E. (U) COMPARISON WITH FINAL VERSION FY1992/93 OSD/OMB RDDS
1. (U) Technical Changes: None.
2. (U) Schedule Changes: Schedule extended six months due to Congressional reduction in FY 1991.
3. (U) Cost Changes: None.

F. (U) PROGRAM DOCUMENTATION:

	MK 46 VARIANT	MK 50 VARIANT
NPDM (M/S IIIA)	8/89	12/97
NPDM (M/S IIIB)	4/91	N/A
DCP	8/89	2/91
OT-IIA Report	7/89	4/97
OT-IIB/C Report	12/90	-
ILSP S1504-276-A-P-I	5/90	10/91
TEMP 917	5/89	-
TEMP 917-1	-	5/91
Acquisition Plan 412-85 Rev B (88)	12/88	2/91

G. (U) RELATED ACTIVITIES: The MK 50 Torpedo is being developed under PE 0604610N.

PROGRAM ELEMENT: 0604355N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Vertical Launch ASROC
PROJECT NUMBER: S1504 PROJECT TITLE: Vertical Launch ASROC

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT						
WPN			3,300		TBD	TBD

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION:
Test and Evaluation Activity (Past 3 Year

Event	Planned Date	Actual Date	Remarks
Range Table Test (3 missiles)	Nov 88	Nov 88	Success.
DT/OT (3 Missiles) Flight Tests	Sep 88	Dec 88	Delayed because of funding constraints. Two missiles flew successfully, landed within CEP and torpedoes ran. Third missile was considered a no-test but a reliability failure.
Range Table Test (3 missiles)	Jan 89	Feb 89	Delayed because of launch site availability. Tests were successful.
Maintenance Demonstration	Mar 89	Mar 89	Maintenance documentation and maintenance actions successfully verified.
At Sea Test from YD 197 (1 missile)	Apr 89	May 89	Air stabilizer did not separate from torpedo at water entry. Air stabilizer did not meet drawing requirements with respect to hardness criteria of release mechanism.
At Sea Test from DD 967 (3 missiles)	New	Jun 89	Evaluate nose cap/air stabilizer modifications. Tests were successful.
TECHEVAL (5 missiles)	May 89	Sep 89	Delayed as a result of nose cap modification tests and availability of services.
OPEVAL (10 missiles)	Jan 90	Aug 90	Delayed to get services that would support end to end testing. OPTEVFOR considered VLA not to be operationally suitable. They did not comment on effectiveness because of the small sample size and recommended additional testing.

Test and Evaluation Activity
(Next Year)

The Navy in the process of reviewing the OPEVAL results and the VLA program. As a result of that review they will determine if additional testing and a production decision is warranted.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604358N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Close-In Weapon System (PHALANX)
PROJECT NUMBER: S0172 PROJECT TITLE: Close-In Weapon System (PHALANX)
POPULAR NAME: PHALANX



A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	TO COMPLETE
PROGRAM	IIIB	I(BLK II)	II(BLK II)		III(BLK II)
MILESTONES:	MAY	DEC 90	AUG 92		JUL 97
ENGINEERING	B/L 2	B/L 3		BLK II	BLK II PRR
MILESTONES:	PRR	CDR/PRR		CDR	FY 95
T&E	B/L 1			B/L 3	BLK II DT/OT
MILESTONES:	OT III			FOT&E	FY 95-96
CONTRACT	Block I		BLK II		BLK II
MILESTONES:	B/L 2		FSED		Prod.
	Prod.		FY 92-96		FY 97

BUDGET ($K)	FY 1990	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL TO COMPLETE
MAJOR CONTRACT:	N/A	N/A	3,200	18,000	Cont.
SUPPORT CONTRACT:	N/A	N/A	N/A	N/A	N/A
IN-HOUSE SUPPORT	5,610	5,854	6,917	7,396	Cont.
GFE/ OTHER:	840	493	480	500	Cont.
Total:	6,450	6,347	10,597	25,896	Cont.

PROGRAM ELEMENT: 0604358N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Close-In Weapon System (PHALANX)
PROJECT NUMBER: S0172 **PROJECT TITLE:** Close-In Weapon System (PHALANX)

B. ( ) DESCRIPTION: The PHALANX Close-In Weapon System (CIWS) is an automatic, fast-reaction, computer-controlled radar and gun system. It functions as the last segment in the Navy's "defense-in-depth" concept. Its mission is to detect, engage, and destroy hostile anti-ship missiles that have penetrated the ship primary defense systems. It is intended for simple installation on a large variety of Navy ships. The program requirements are contained in the CIWS Block I (MK 15 MODS 11-14) TEMP 142-1 (Rev 2). The system consists of a search and track radar subsystem, a six-barrel Gatling gun, and a control system. When operating automatically, the CIWS' primary mode of operation, the system continually searches in azimuth. It automatically detects, evaluates, tracks, and engages threats and then returns to search mode ready for another target. The initial CIWS version. Block 0, has been approved for service use (ASU) and is in the fleet.

In FY 88 Block I received Approval for Limited Production for FY 88 and FY 89 procurements. In FY 90 Block I received Approval for Full Rate Production.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. (U) Conducted Tactical Missile Test of Block I in ex-STODDARD.
   b. (U) Gained Block I Approval for Full Production (Milestone III-B).
   c. (U) Performed system engineering and effectiveness analysis to maintain capability versus threat.
   d. (U) Conducted AEGIS interface testing.
   e. (U) Continued high velocity tungsten/DU penetrator evaluation.
2. (U) FY 1991 Program:
   a. (U) Perform system engineering and effectiveness analysis to maintain capability versus threat.
   b. (U) Initiate planning/system concept definition for Block II.
3. (U) FY 1992 Plans:
   a. (U) Perform system engineering and effectiveness analysis to maintain capability versus threat.
   b. (U) Begin Full Scale Engineering Development (FSED) for Block II.

PROGRAM ELEMENT: 0604358N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Close-In Weapon System (PHALANX)
PROJECT NUMBER: S0172 **PROJECT TITLE:** Close-In Weapon System (PHALANX)

4. (U) FY 1993 Plans:
   a. (U) Perform system engineering and effectiveness analysis to maintain capability versus threat.
   b. (U) Begin Block I Baseline 3 testing.
   c. (U) Continue FSED for Block II.
   d. (U) Modify test platform and test range instrumentation.
5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSWC Dahlgren, VA; NAVORDSTA, Louisville, KY. CONTRACTORS: General Dynamics, Pomona, CA; General Electric, Pittsfield, MA.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

(1) (U) TECHNICAL CHANGES: Not Applicable.
(2) (U) SCHEDULE CHANGES: Not Applicable.
(3) (U) COST CHANGES: Not Applicable.

F. (U) PROGRAM DOCUMENTATION: CIWS Block I TEMP 142-1 (Rev 2) 8/89

G. (U) RELATED ACTIVITIES: Program Element 0603319N, (NATO AAW Systems).

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMP.	TOTAL PROGRAM
(U) PROCUREMENT						
WPN (411000 411001)	59,868	54,477	0	0	0	0
Quantity	18	11	0	0	0	0
SCN (Various)	79,098	80,023	81,546	67,047	Con't	Con't
Quantity	15	16	14	12	Con't	Con't
WPN MODS (420500)	54,819	64,455	54,379	54,348	Con't	Con't

PROGRAM ELEMENT: 0604358N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Close-In Weapon System (PHALANX)
PORJECT NUMBER: S0172 PROJECT TITLE: Close-In Weapon System (PHALANX)

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: GOALKEEPER Close-In Weapon System Foreign Weapon Evaluation.

- Candidate nomination proposal submitted for testing the Dutch 30mm GOALKEEPER CIWS during FY 1989/FY 90.
- Coproduced by Hollandse Signaalapparaten (HSA) Netherlands and General Electric (GE) United States.
- United Kingdom provided GOALKEEPER system for effectiveness evaluation at Pacific Missile Test Center, California.
- Nine missile targets (3 from UK, 6 from US). System installed on ex-USS STODDARD and tests were remotely controlled.
- US financial commitment estimate $6M; UK and HSA/GE estimates unknown.
- Memorandum of Understanding concluded by US/UK in January 1990.
- Test was conducted August 1 - August 21, 1990.
- Final test report signed 30 November 1990.

J. (U) TEST AND EVALUATION: This information is contained in the FY 1991 Congressional Data Sheet.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0604361N **Budget Activity:** 4
Program Element Title: NATO SEASPARROW
Project Number: SO173 **Project Title:** NATO SEASPARROW

A. (U) Resources (Dollars in Thousands)

Project Number	Title	FY 1990 Actual	FY 1991 Estimate	FY 1992 Estimate	FY 1993 Estimate	To Complete	Total Program
SO173	NATO SEASPARROW	4,693	5,481	6,234	6,386	11,569	134,667

B. (U) Description: This program integrates multiple weapon and sensor systems in the operational computer program (OCP) in the MK-23 Target Acquisition System (TAS) to improve acquisition and reaction times for shipboard self defense systems. This will occur through improved correlation/association and Threat Evaluation Weapon Assignment (TEWA) algorithms. Corrects fire control system deficiencies noted during RIM-7M OPEVAL. Updates TAS software to match evolution of shipboard Combat Direction System (CDS).

C. (U) Program Accomplishments and Plans:

1. (U) FY 1990 Accomplishments:
   a. (U) Support RIM-7M (PIP) OPEVAL; continue TAS Program integration including land based testing of RADAR/IR/ESM correlation mods.
   b. (U) Commence development of a single, common UYK-44 program supporting MK-23 interface with CDS and non-CDS equipped ships.
2. (U) FY 1991 Program:
   a. (U) Conduct at-sea testing of TAS Program mods.
   b. (U) Commence development of MK-23 TAS Computer Program.
   c. (U) Commence RIM-7P OPEVAL deficiency correction program.
3. (U) FY 1992 Plans:
   a. (U) Continue TAS Integration OCP for LHD-5 Self Defense Surface Missile Systems/Rolling Airframe missile (SDSMS/RAM) installation.
   b. (U) Complete RIM-7P OPEVAL deficiency correction program.
   c. (U) RIM-7R evolution and platform integration program.
   d. (U) NSSMS and TAS performance improvement program.
4. (U) FY 1993 Plans:
   a. (U) Continue TAS Integration OCP for LHD-5 SDSMS/RAM installation.
   b. (U) SDSMS integration program.
   c. (U) RIM-7R OPEVAL support, including Self Defense Test Ship OPS.
   d. (U) NSSMS and TAS performance improvement program.
5. (U) Program to completion: Date of completion - 1995.
   a. (U) RIM-7R OPEVAL deficiency correction program.
   b. (U) RIM-7 evolution and platform integration program.
   c. (U) NSSMS and TAS performance improvement program.
   d. (U) Complete SDSMS integration program.

D. (U) Work Performed By: In-House: NSWSES, Port Hueneme, CA. Contractors: Hughes Aircraft Company, Fullerton, CA.

E. (U) Related Activities: P.E. 0603609N, Conventional Munitions; P.E. 0604369N, 5-inch Rolling Airframe Missile; P.E. 0604608N, Surface Electro-Optic Systems; P.E. 0603319N, NATO AAW Systems.

F. (U) Other Appropriation Funds: Not Applicable.

G. (U) International Cooperative Agreements: MOU for International development of NSSMS (June 88). MOU for Cooperative Support of NSSMS (Dec 77).

FY 1992 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604363N BUDGET ACTIVITY: 3-Strategic Programs
PROGRAM ELEMENT TITLE: TRIDENT II

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMP.	TOTAL PROGRAM
J0951	TRIDENT II Missile	195,535	69,937	60,599	88,832	Cont.	Cont.
J1546	TRIDENT II Ship Systems	814	500	1,004	999	1,964	49,355
	TOTAL	196,349	70,437	61,603	89,831		

B. (U) BRIEF DESCRIPTION OF ELEMENT: The TRIDENT II (D5) Strategic Weapon System program (Project - J0951) developed an improved Sea Launched Ballistic Missile (SLBM) with greater accuracy and payload capability at equivalent ranges as compared to the TRIDENT I (C4) system. TRIDENT II enhances U.S. strategic deterrence by providing a survivable sea-based system capable of engaging the full spectrum of potential targets. It also enhances the U.S. position in strategic arms negotiations by providing a weapon system with performance and payload flexibility that will accommodate various treaty initiatives. TRIDENT II's increased payload allows the deterrent mission to be achieved with fewer submarines. Development effort continues for the SLBM Effectiveness Enhancement (SEE) program which is needed to resolve critical technology issues associated with maintaining and enhancing TRIDENT II capability and effectiveness for the SLBM Retargeting System (SRS); and for portable vans to replace test range support ships. Funding for TRIDENT II Ship Systems (Project - J1546) will be used for investigation, identification, and resolution of system design and material problems associated with the TRIDENT II Weapon System interface with the TRIDENT submarine baseline.

FY 1992 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604363N BUDGET ACTIVITY: 3-Strategic Programs
PROGRAM ELEMENT TITLE: TRIDENT II
PROJECT NUMBER: J0951 PROJECT TITLE: TRIDENT II Missile

POPULAR NAME: TRIDENT II

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993
Program Milestones				
Engineering Milestones	First DASO (Feb) IOC: March			
T&E Milestones	DT Ended (Feb) OT II Ended (Mar)	OT III Begins: Dec		
Contract Milestones				

BUDGET (SK)	FY 1990	FY 1991	FY 1992	FY 1993	Program Total
Major Contract	166,900	62,700	53,000	79,900	CONT.
Support Contract	7,700	-			N/A
In-House Support	23,900	7,200	7,600	8,900	CONT.
TOTAL 1/	195,500	69,900	60,600	88,800	CONT. 2/

1/ The total cost for TRIDENT II (D5) Missile development as reflected in the 31 December 89 Selected Acquisition Report (SAR) is $9,380.8 million.

2/ Costs include: SLBM Effectiveness Enhancement (SEE), SLBM Retargeting System (SRS), payment of TRIDENT II development program estimated incentives, and development of portable vans.

PROGRAM ELEMENT: 0604363N BUDGET ACTIVITY: 3-Strategic Programs
PROGRAM ELEMENT TITLE: TRIDENT II
PROJECT NUMBER: J0951 PROJECT TITLE: TRIDENT II Missile

B. (U) BRIEF DESCRIPTION OF MISSION REQUIREMENT AND SYSTEM CAPABILITIES: The TRIDENT II (D5) Strategic Weapon System program developed an improved Sea Launched Ballistic Missile (SLBM) with greater accuracy and payload capability at equivalent ranges as compared to the TRIDENT I (C4) system. TRIDENT II enhances U.S. strategic deterrence by providing a survivable sea-based system capable of engaging the full spectrum of potential targets. It also enhances the U.S. position in strategic arms negotiations by providing a weapon system with performance and payload flexibility that will accommodate various treaty initiatives. TRIDENT II's increased payload allows the deterrent mission to be achieved with fewer submarines. Development effort continues for the SLBM Effectiveness Enhancement (SEE) Program which is needed to resolve critical technology issues associated with maintaining and enhancing TRIDENT II (D5) capability and effectiveness, which is especially important since TRIDENT II backfits have been delayed until 2002; for the SLBM Retargeting System (SRS); and for portable vans to replace test range support ships.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

a. (U) Achieved a March 1990 IOC for the TRIDENT II (D5) Strategic Weapon System on OHIO Class SSBN 734.

b. (U) Major effort was expended on analysis of development flight test results.

c. (U) Development documentation for all D5 subsystems was finalized.

d. (U) D5 weapon system accuracy evaluation has gained confidence based on analysis of development flight test results.

e. (U) Performance of subsystem prime development contractors was evaluated for purpose of determining incentive fees.

f. (U) Effort intensified for the SLBM Effectiveness Enhancement (SEE) Program which is needed to resolve critical technology issues associated with maintaining and enhancing the effectiveness of TRIDENT I and TRIDENT II (D5). This program has evolved from the Ballistic Missile Defense Penetration System effort initiated in FY 1984.

g. (U) Effort was expended to develop an SLBM Retargeting System (SRS).

2. (U) FY 1991 Program:

a. (U) TRIDENT II development Training Program efforts will conclude with the completion of contractor led development/curricula.

b. (U) Evaluation of the performance of development contractors will continue for the purpose of determining incentive payments.

c. (U) SLBM Effectiveness Enhancement (SEE) effort will continue in order to resolve critical technology issues associated with maintaining and enhancing the capability and effectiveness of TRIDENT II (D5).

d. (U) Effort will intensify to develop an SLBM Retargeting System (SRS).

PROGRAM ELEMENT: 0604363N BUDGET ACTIVITY: 3-Strategic Programs
PROGRAM ELEMENT TITLE: TRIDENT II
PROJECT NUMBER: J0951 PROJECT TITLE: TRIDENT II Missile

e. (U) Develop portable flight test instrumentation vans to replace launch area and downrange support ships at the test ranges.

3. (U) FY 1992 Plans:

a. (U) Performance of D5 subsystem development contractors will continue to be evaluated in order to determine incentive payments.

b. (U) SLBM Effectiveness Enhancement (SEE) efforts will continue with the resolution of critical technology issues associated with maintaining and enhancing the capability and effectiveness of TRIDENT II (D5).

c. (U) Development of an SLBM Retargeting System (SRS) will continue.

d. (U) Development of portable flight test instrumentation vans to replace launch area and downrange support ships at the test ranges will continue.

4. (U) FY 1993 Plans:

a. (U) Evaluation of D5 subsystem development contractors' performance will conclude and final incentive payments will be made.

b. (U) SLBM Effectiveness Enhancement (SEE) effort will continue to support the resolution of critical technology issues associated with maintaining and enhancing the capability and effectiveness of TRIDENT II (D5).

c. (U) SLBM Retargeting System (SRS) development will continue.

d. (U) Development of portable flight test instrumentation vans to replace range support ships will continue.

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: Strategic Systems Programs, Washington, DC. CONTRACTORS: General Electric Company, Ordnance Systems, Pittsfield, MA; UNISYS Corp., Shipboard and Ground Systems Group, Great Neck, NY; Charles Stark Draper Laboratory, Cambridge, MA; Lockheed Missiles and Space Company, Sunnyvale, CA; and others.

E. (U) COMPARISON WITH REVISED FY 1991 PRESIDENT'S BUDGET:

1. (U) Technical Changes: NONE
2. (U) Schedule Changes: NONE
3. (U) Cost Changes: FY 1991 (17,813) -Partial reductions to the Survivability Effectiveness Enhancement (SEE).

F. (U) PROGRAM DOCUMENTATION: DCP - 2/87; NAPDD #171-02 (SEE) - 9/87; TEMP - 8/89; OR #196-02-88 (SRS) - 1/88

PROGRAM ELEMENT: 0604363N BUDGET ACTIVITY: 3-Strategic Programs
PROGRAM ELEMENT TITLE: TRIDENT II
PROJECT NUMBER: J0951 PROJECT TITLE: TRIDENT II Missile

G. (U) RELATED ACTIVITIES:
1. Program Element 0101221N, Fleet Ballistic Missile System, Project J0091. Developments related to deployed POSEIDON (C3) and TRIDENT I (C4) Strategic Weapon Systems.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT						
WPN LI 2&3	1,399.1	1,536.3	1,517.0	1,469.0	CONT.	CONT.
(U) MILCON	7.6	115.9	49.6	40.4	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable

J. (U) TEST AND EVALUATION: This information is contained in the FY 1991 Congressional Data Sheets.

FY 1992 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604363N BUDGET ACTIVITY: 3-Strategic Programs
PROGRAM ELEMENT TITLE: TRIDENT II
PROJECT NUMBER: J1546 PROJECT TITLE: TRIDENT II Ship Systems

C. (U) BRIEF DESCRIPTION OF ELEMENT: Project J1546 identified the necessary subsystem changes to incorporate the TRIDENT II (D5) into the TRIDENT submarine baseline and develop the necessary weapon support systems and/or components. The ninth OHIO Class submarine (SSBN 734) was the first ship to accommodate the TRIDENT II (D5) Weapon System. Effort continues for investigation, identifications and resolution of systems design and material problems associated with the Weapon System interface with the TRIDENT submarine baseline.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
a. Continued development of weapon support system interfaces and components.
b. Continue evaluation of weapon and weapon support system operational parameters and installation of equipments in the weapon support system land based evaluation facility.
2. (U) FY 1991 Programs:
a. Continue to investigate, identify and resolve system design and material problems associated with the weapon system interface with the TRIDENT submarine baseline.
b. Evaluate Weapon Support Systems design based on Air Conditioning Sea Trial (ACTDAS) test results.
3. (U) FY 1992 Plans:
a. Continue to investigate, identify and resolve system design and material problems associated with the weapon system interface with the TRIDENT submarine baseline.
b. Develop long term component aging failure analysis impacts.
4. (U) FY 1993 Plans:
a. Continue to investigate, identify and resolve system design and material problems associated with the weapon system interface with the TRIDENT submarine baseline.
b. Complete long term component aging failure analysis.
5. (U) Program to Completion
a. Continue to investigate, identify and resolve system design and material problems associated with the weapon system interface with the TRIDENT submarine baseline.
b. Complete analysis of all required modifications, and the impact the modifications have on component/system aging. Program ends in FY 1995.

E. (U) WORK PERFORMED BY: IN-HOUSE: Naval Sea Systems Command, Washington, DC. CONTRACTORS: General Dynamics Electric Boat, Groton, CN.

F. (U) RELATED ACTIVITIES: TRIDENT Submarine Systems, Program Element 0101228N/S0004.

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable

FY 1992/93 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604366N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: STANDARD MISSILE IMPROVEMENTS

A. (U) RESOURCES: (DOLLARS IN THOUSANDS):

PROJ NO.	TITLE	FY90 ACTUAL	FY91 EST.	FY92 EST.	FY93 EST.	TO COMP	TOTAL PROGRAM
S0176	SM TESTING	15,786	0*	0	0	0	0
S0439	SM IMP.	42,826	48,457	36,821	19,911	CONT	CONT
TOTAL		58,612	48,457	36,821	19,911	CONT	CONT

*BEGINNING IN FY91, FUNDING IS REFLECTED IN SM IMPROVEMENT PROJECT S0439

B. (U) DESCRIPTION:

This program element provides for engineering development/improvement to current versions of STANDARD Missile to counter evolving threats.

PROGRAM ELEMENT: 0604366N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: STANDARD MISSILE IMPROVEMENTS
PROJECT NUMBER: S0439 PROJECT TITLE: STANDARD MISSILE IMPROVEMENTS

A. ( ) SCHEDULE/BUDGET INFORMATION: (DOLLARS IN THOUSANDS)

SCHEDULE	FY90	FY91	FY92	FY93
PROGRAM MILESTONES				
ENGINEERING MILESTONES				
T&E MILESTONES				
CONTRACT MILESTONES				

PROGRAM ELEMENT: 0604366N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: STANDARD MISSILE IMPROVEMENTS
PROJECT NUMBER: S0439 PROJECT TITLE: STANDARD MISSILE IMPROVEMENTS

BUDGET ($K)	FY90	FY91	FY92	FY93	TO COMP	TOTAL PROGRAM
MAJOR CONTRACT	29,303	31,176	21,021	7,111	CONT	CONT
SUPPORT CONTRACT	100	1,600	2,800	4,500	CONT	CONT
IN-HOUSE SUPT	13,194	15,282	12,400	7,900	CONT	CONT
GFE/OTHER	229	399	600	400	CONT	CONT
TOTAL	42,826	48,457	36,821	19,911	CONT	CONT

B. ( )

C.( ) PROGRAM ACCOMPLISHMENTS AND PLANS:
1.( ) FY1990 Accomplishments:
a. ( ) Completed
b. ( ) Continue hardware fabrication
c. ( ) Complete
d. ( ) Block III achieved 1990.

PROGRAM ELEMENT: 0604366N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: STANDARD MISSILE IMPROVEMENTS
PROJECT NUMBER: S0439 PROJECT TITLE: STANDARD MISSILE IMPROVEMENTS

2. ( ) FY1991 Program:
   a. ( ) Complete
   b. ( )
   c. ( ) Complete
   d. ( ) Conduct
   e. ( ) Conduct
   f. ( ) Develop
   g. (U) Complete documentation of the SM-2 program (Block IIIA).
   h. (U) Continue engineering efforts to incorporate lessons learned from flight testing (Block IIIA).

C. ( ) PROGRAM ACCOMPLISHMENTS AND PLANS CONTINUED):

2. ( ) i. (U) Complete data analysis of flight testing (Block IIIA).
   j. ( )
   k. ( ) Continue FSED
   l. ( ) Complete
   m. ( ) Support award of pilot production ORDALTS
3. ( ) FY1992 Plans:
   a. ( ) Complete flight tests
   b. ( ) Conduct Acquisition Review Board (ARB)
4. ( ) FY 1993 Plans:
   a. ( ) Conduct at-sea
   b. ( ) Complete
   c. ( ) Release
   d. ( ) Achieve
5. (U) Program to Completion:
   a. (U) Modify and introduce MHIP for the TARTAR missile in 1994.
   b. (U) Develop Dual Pack concept by 1995.
   c. (U) Complete insensitive munition improvements by 1996.
   d. (U) Initiate common MR/ER missile in 1995.

D. (U) WORK PERFORMED BY:

IN-HOUSE: Johns Hopkins University, APL, Laurel, MD; Naval Weapons Center, China Lake, CA; Naval Surface Warfare Center, Dahlgren, VA;
CONTRACTORS: General Dynamics, Pomona, CA; Raytheon Company, Bedford, MA; Motorola GEG, Scottsdale, AZ; Allied Signal, Communications Division, Baltimore, MD; RCA,Moorestown, NJ.

PROGRAM ELEMENT: 0604366N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: STANDARD MISSILE IMPROVEMENTS
PROJECT NUMBER: S0439 PROJECT TITLE: STANDARD MISSILE IMPROVEMENTS

E. (U) COMPARISON WITH FY1991 PRESIDENT'S BUDGET:

1. (U) TECHNICAL CHANGES: None
2. (U) SCHEDULE CHANGES: Block IIIA at-sea DT/OT delayed to FY91 to achieve fuze design maturity/production. Block IIIB delayed to phase available funding to match contractor work schedule. All schedule changes reflect program baseline documentation at OSD for approval.
3. (U) COST CHANGES: The FY 1991 budget increased by $3,723K to fund Block IIIA fuze development.

F. (U) PROGRAM DOCUMENTATION:

AP 408-85 Amendment 2 TAB approved 6 June 86
PEM signed 7 October 85

F. (U) PROGRAM DOCUMENTATION (Continued):

J&A approved 28 March 86
PMP 85-02 approved 23 May 86
PMP IIIB (MHIP) 89-1 approved 17 July 89
III/IIIA TEMP 623-1 Change 1 approved 13 June 89
III/IIIA/IIIB (MHIP) TEMP 623-1 REV 1, CH 1 Navy approval 11/15/90
NDCP approved 10 May 88
IIIB (MHIP) NDCP approved 24 July 89
IIIB (MHIP) AP SEA 89-02/AIR 88-28 approved 22 SEP 89
BASELINE documentation at OSD for approval

G. (U) RELATED ACTIVITIES:

Program Element 0603318N, AEGIS ER supports development of SM-2 Block IV. The ordnance section being developed in this program element for SM-2 Block IIIA is to be provided as GFE Raytheon as part of PE 0603318N.

PROGRAM ELEMENT: 0604366N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: STANDARD MISSILE IMPROVEMENTS
PROJECT NUMBER: S0439 PROJECT TITLE: STANDARD MISSILE IMPROVEMENTS

H. (U) OTHER APPROPRIATION FUNDS: (DOLLARS IN THOUSANDS)

WEAPONS PROCUREMENT, NAVY (RAD IX):

	FY90 ACTUAL	FY91 EST.	FY92 EST.	FY93 EST.	TO COMP	TOTAL PROGRAM
BLK III						
(U) FUNDS	390,214	0	0	0	0	0
(U) QUANTITY	710					
BLK IIIA						
(U) FUNDS		250,126	18,908	18,816	0	0
(U) QUANTITY		490	30	30		
BLK IIIB						
(U) FUNDS	19,500	213,278	212,475	CONT	CONT	
(U) KIT QUANTITY	100	66	79	CONT	CONT	
(U) MISSILE QUANTITY		300	300	CONT	CONT	

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS:

Not applicable.

J. ( ) TEST AND EVALUATION:

Block IIIA Previous Results: None

FY 1991 Plans:

Block IIIB Previous Results: None

FY 1991 Plans: None

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0604367N **Budget Activity:** 4

Program Element Title: TOMAHAWK

Program Number: W1784 **Project Title:** THEATER MISSION PLANNING



POPULAR NAME: Theater Mission Planning Center (TMPC)/ Afloat Planning System (APS)

A. (U) SCHEDULE/BUDGET INFORMATION:

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	To Complete
Program Milestones		MS2 ISPS (SEP)	MS 3A/APS (JUL)	MS 3A/IOC TMPCU (OCT) MS 3B APS (APR) IOC APS (AUG)	IOC ISPS
Engineering Milestones	Des Rev. APS & TMPCU		TMPCU S/W Des Rev P2/3	TMPCU P3	
T&E Milestones		DT/OT IIB APS	DT/OTIIA TMPCU OPEVAL APS	OPEVAL TMPCU Prec 2 FOT&E TMPCU	DT/OT IIAB/ OPEVAL ISPS
Contract Milestones	TMPCU APS ISPS	TMPCU APS ISPS	TMPCU APS ISPS	TMPCU APS ISPS	ISPS

BUDGET ($K)	FY 1990	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL
Major Contract	14,951	9,145	25,315	6,623	56,034
Support Contract	0	0	0	0	0
In-House Support	1,695	3,150	3,500	1,200	9,545
GFE/Other	0	0	0	0	0
Total	16,646	12,295	28,815	7,823	65,579

Program Element: 0604367N Budget Activity: 4
Program Element Title: TOMAHAWK
Program Number: W1784 Project Title: THEATER MISSION PLANNING

B. (U) DESCRIPTION: The Tomahawk Theater Mission Planning Center (TMPC) Upgrade ashore and Afloat Planning System (APS) provide data base generation and processing, flight mission data, command and control information preparation, and distribution for nuclear and conventional land attack missiles (TLAM). The TMPC Upgrade project designs and develops software to decrease mission planning time in response to contingency requirements, improve the production of mission data for distribution and provide automated command and control information for employment and strike planning. APS utilizes the TMPC Upgrade's software on down-sized computer hardware for use in support of Afloat Strike Warfare Commanders. This improves battle-group tactical flexibility and responsiveness while maximizing Tomahawk Weapon Systems (TWS) wartime capability. ISPS allows cruise missile, guns, and manned aircraft strike and anti-surface warfare planning to be accomplished in a consolidated system to improve overall effectiveness and efficiency. These systems will be compatible with the Navy Command and Control Systems (NCCS), TMPC ashore and the TWS.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. (U) Continued TMPC Upgrade, APS program development, and systems integration.
   b. (U) Commenced ISPS development.
2. (U) FY 1991 Program:
   a. (U) Continue TMPCU Upgrade program development DT/OT.
   b. (U) Continue APS development and install EDM units.
   c. (U) Continue development of ISPS.
3. (U) FY 1992 Plans:
   a. (U) Complete TMPCU and TMPCU Precedence 2
   b. (U) Continue APS development and OPEVAL
   c. (U) Continue development of ISPS
4. (U) FY 1993 Plans:
   a. (U) Complete TMPCU Precedence 3
   b. (U) Complete APS development
   c. (U) Continue ISPS development
5. (U) To Complete: Program Complete

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSWC, Dahlgren, VA; NAVSHIPWPNSYSENGSTA, Port Hueneme, CA; NAVAVIONICCEN, Indianapolis, IN; Naval Electronic Systems Engineering Activity Detachment (NESEA Det), Philadelphia, PA; CINCPAC, Camp Smith, HI; CINCLANT, Norfolk, VA.

Program Element: 0604367N Budget Activity: 4
Program Element Title: TOMAHAWK
Program Number: W1784 Project Title: THEATER MISSION PLANNING

Contractors: McDonnell Douglas Missiles System Company, St. Louis, MO; Tiburon System Inc., San Jose, CA; Science Application Inc., Arlington, VA; Applied Physics Laboratory, Johns Hopkins University, Laurel MD; General Dynamics Electronics, San Diego, CA.

E. (U) COMPARISON WITH THE FY 1991 PRESIDENT'S BUDGET:

1. (U) ENGINEERING CHANGES: None.

2. (U) SCHEDULE CHANGES: Theater Mission Planning Upgrade and the associated Afloat Planning System deliveries have slipped because of software development problems on the part of the contractor. The slip in IOC from January 1992 to October 1992 does not have major impacts because the current mission planning software is available and in use world wide. However, the slip in the TMPC software delays the IOC for APS which uses the same software.

3. (U) COST CHANGES: Congressional reduction of $3M in FY91.

F. (U) PROGRAM DOCUMENTATION:

	TOR	DOP	OR	NDCP	TEMP
TMPC Baseline	N/A	N/A	N/A	8/83	8/87
TMPC Upgrade	N/A	N/A	N/A	8/88	12/88
APS	6/86	9/87	N/A	8/88	12/88
ISPS	7/87	7/88	10/88	N/A	2/91

G. (U) RELATED ACTIVITIES:

PE 0204229N (Surface Combined ORD/MISSL, TOMAHAWK)
PE 0604370N (SSN-688 Class Vertial Launch System)
PE 0604707N (Over-The-Horizon Targeting)

H. (U) OTHER APPROPRIATION FUNDS: (Dollar in Thousands)

APPN/P-1	FY 1989 Actual	FY 1990 Estimate	FY 1991 Estimate	To Complete	To Program
WPN/#6,7,28	[Procurement justification material does not contain this level of detail.]				
OPN/#224,225					

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604369N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: 5" ROLLING AIRFRAME MISSILE
PROJECT NUMBER: SO167 PROJECT TITLE: RAM MK-31 GUIDED MISSILE WEAPON SYSTEM

POPULAR NAME: RAM



A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

Schedule	FY 1990	FY 1991	FY 1992	FY 1993	To Complete
Program Milestones					
Engineering Milestones	IRMU Feas. Study Completed 8/90				
T&E Milestones	DT-IIE/OT-IIB - 5/90				
Contract Milestones	Infrared Guidance Mode Upgrd				
	Feas Study 8/89				

PROGRAM ELEMENT: 0604369N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: 5" ROLLING AIRFRAME MISSILE
PROJECT NUMBER: SO167 PROJECT TITLE: RAM MK-31 GUIDED MISSILE WEAPON SYSTEM

BUDGET ($K)	FY 1990	FY 1991	FY 1992	FY 1993	Program Total To Complete
Major Contract	1,525	0	0	0	125,324 0
Support Contract	250	0	0	0	20,930 0
In-House Support	2,996	0	0	0	43,540 0
GFE/Other	300	0	0	0	300 0
Total	5,071	0	0	0	190,094 0

B. (U) DESCRIPTION: The purpose of this program is to develop a surface-to-air self-defense system utilizing a dual mode, passive Radio Frequency/Infrared 5" Rolling Airframe Missile. The baseline system provided a self-defense capability against incoming active radar guided anti-ship missiles and was developed on an equal cost share basis with the Government of the Federal Republic of Germany. The planned effort will provide a capability against passive anti-ship missiles hru the incorporation of an IR all-the-way guidance mode (IRMU). This system will complement existing point defense systems and provide the fleet with a high firepower system capable of engaging the growing and changing anti-ship missile threat.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. (U) Completed TECHEVAL/OPEVAL in FY 1990. OPEVAL report issued Sept 1990.
   b. (U) Continued low altitude fuze efforts.
   c. (U) Completed feasibility/predesign of Block I Upgrade Program, including threat definition, guidance design evaluation, ship system evaluation, launcher modifications, and simulation preparation.
2. (U) FY 1991 PROGRAM:
   a. (U) Terminate RAM Mk-31 Guided Missile Weapon System Program.

D. (U) WORK PERFORMED BY: IN-HOUSE - Naval Weapons Center, China Lake, CA (Acquisition Engineering Agent and Design Agent for GMRP). Naval Surface Weapons Center, Dahlgren,VA; Naval Ship Weapon Systems Engineering Station, Port Hueneme, CA (AEA for GMLS, ISEA for GMWS); Naval Ordnance Missile Test Facility, White Sands, NM; Naval Warfare Assessment Center, Corona, CA; Pacific Missile Test Center, Point Mugu, CA. PRIME CONTRACTOR - General Dynamics Corp., Ontario, CA. RAMSYS GmbH, Ottobrunn, West Germany. TRANSLANT, Inc., Ontario, CA. OTHER: Johns Hopkins University, Applied Physics Laboratory, Laurel, MD.

PROGRAM ELEMENT: 0604369N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: 5" ROLLING AIRFRAME MISSILE
PROJECT NUMBER: SO167 PROJECT TITLE: RAM MK-31 GUIDED MISSILE WEAPON SYSTEM

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) TECHNICAL CHANGES: Program terminated at the start of FY1991.
2. (U) SCHEDULE CHANGES: Program terminated prior to start of MS III A2.
3. (U) COST CHANGES: The department funding reduction of $2,950,000 in the FY1991 budget results from the decision to terminate at the start of FY1991. All funding has been removed from FY1991 to Completion.

F. (U) PROGRAM DOCUMENTATION:

OR:	5/75	TEMP:	1/90
FSED MOU:	3/79	AP:	6/90
NDCP:	2/89	PRODUCTION MOU:	8/87
ILSP:	8/90		

G. (U) RELATED ACTIVITIES: Under the provisions of the MOU with Germany, the U.S. development costs shown will be matched by German government development funds. Program element 0605863N Self Defense Test Ship.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 Actual	FY 1991 Estimate	FY 1992 Estimate	FY 1993 Estimate	To Complete	Total Program
(U) WPN 302242 Missiles	1,986	0	0	0	0	175,731
(U) Procurement Quantity	(0)	(0)	(0)	(0)	(0)	(500)
(U) WPN 302242 Retrofit					0	0
(U) Procurement Quantity					(0)	(0)
(U) OPN (GMLS)	16,824	2,796	0	0	0	71,805
(U) Procurement Quantity	(0)	(0)	(0)	(0)	(0)	(6)
(U) Nunn Funding	4,000	1,000	0	0	0	11,000

PROGRAM ELEMENT: 0604369N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: 5" ROLLING AIRFRAME MISSILE
PROJECT NUMBER: SO167 **PROJECT TITLE:** RAM MK-31 GUIDED MISSILE WEAPON SYSTEM

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS:

(U) On 17 October 1986, OUSD (IP & T) provided ASN (RE & S) authority to conclude negotiations on a cooperative production MOU with the Federal Republic of Germany (GE) as a follow on to earlier jointly executed MOUs for Advanced Development in 1977 (U.S. and GE) and Full-Scale Engineering Development in 1979 (U.S., GE, and the Kingdom of Denmark). The production MOU was approved and signed by both countries on 3 August 1987. The MOU requires dual-source production of the Guided Missile Round Pack and coproduction of the Guided Missile Launching System. After qualification of both sources, a U.S. prime contractor (General Dynamics/Valley Systems Division) and a GE follower (RAMSystem GmbH) were to compete commencing in 1990 for combined annual U.S. and GE missile requirements. The IRMU development had commenced as a follow-on development under this Production MOU. GD/VSD and GE industry have formed a joint venture, TRANSLANT, to produce the launcher, with GE industry performing over half of the fabrication effort. Both countries share joint costs, either pro rata or equally.

J. (U) TEST AND EVALUATION: This information is provided in FY 1992/93 Congressional Data Sheets.

FY 1992/3 RDT&E NAVY DESCRIPTIVE SUMMARY

Program Element: 0604372N Budget Activity: 4
Program Element Title: NEW THREAT UPGRADE (NTU)
Project Title: TERRIER/TARTAR SM-2/NTU

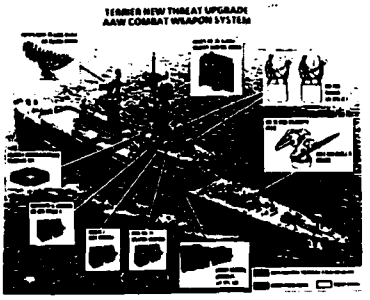
A. (U) RESOURCES: (DOLLARS IN THOUSANDS)

PROJECT NO.	TITLE	FY1990 ACTUAL	FY1991 ESTIMATE	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
SO188	TERRIER SM-2/NTU	2,725	5,351	4,897	2,004	CONTINUED	CONTINUED
SO964	TARTAR SM-2/NTU	4,368	5,837	5,080	4,257	CONTINUED	CONTINUED
TOTAL		7,093	11,188	9,977	6,261	CONTINUED	CONTINUED

B. ( ) DESCRIPTION: This program element develops shipboard weapon engagement system improvements needed to counter current and projected anti-ship cruise missile threats at extended ranges and

The New Threat Upgrade (NTU) program is applicable to a total of 29 TERRIER and TARTAR guided missile cruisers and destroyers. The SM-2 Block I modification is a prerequisite for the follow-on NTU/SM-2 Block II and III modifications to weapon direction systems (WDS), guided missile fire control systems (GMFCS), guided missile launching system (GMLS), and communications tracking sets (CTS) in various ship classes.

Program Element: 0604372N **Budget Activity:** 4
Program Element Title: TERRIER SM-2/NEW THREAT UPGRADE (NTU)
Project Number: S0188 **Project Title:** TERRIER SM-2/NTU



A. (U) Schedule/Budget Information: (Dollars in thousands)

SCHEDULE	FY1990	FY1991	FY1992	FY1993	TO COMPLETE
Program Milestones					
Engineering Milestone					
T&E Milestones		Land-Based Test	At-Sea Test		
Contract Milestones		Phase I (LARIP)	Phase I (LARIP)	Phase I (LARIP)	Continuing

Budget (K$)	FY1990	FY1991	FY1992	FY1993	PROGRAM TOTAL TO COMPLETE
Major Contract	2,012	4,676	3,600	1,120	Continuing
Support Contract	273	400	550	300	Continuing
In-House Support	390	225	697	534	Continuing
GFE/ Other	50	50	50	50	
TOTAL	**2,725**	**5,351**	**4,897**	**2,004**	Continuing

FY1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0604372N Budget Activity: 4
Program Element Title: TERRIER SM-2/NEW THREAT UPGRADE (NTU)
Project Number: S0188 Project Title: TERRIER SM-2/NTU

B. ( ) DESCRIPTION
This project develops modifications required to provide TERRIER NTU Weapon Engagement System in (installed/scheduled to be installed) 19 ships (CG 16/26 and CGN 9 Classes) the capability to engage with STANDARD extended range missiles (SM-1(ER) Blk V; SM-2(ER) Blk II/III).

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

a. (U) Complete design/development of Low Altitude/Readiness Improvement Program (LARIP) PHASE I.
b. (U) Continue design/development of modifications to correct deficiencies from testing and lessons learned.

2. (U) FY 1991 Program:

a. (U) Complete land based testing of LARIP Phase I
b. (U) Continue design/development of modifications to fully exploit SM-2(ER) Blk III round capabilities, correct deficiencies from testing and lessons learned during fleet operations.
c. (U) Complete LARIP Phase I at-sea testing aboard NTU Terrier hull.

3. (U) FY 1992 Plans:

a. (U) Complete design of LARIP follow on Pulse/Doppler Integration (PDI) changes to exploit SM-2(ER) BLK III missile performance capabilities.
b. (U) Conduct land based testing of LARIP/PDI.
c. (U) Continue design/development of modifications to correct deficiencies from testing and lessons learned during fleet operation.

4. (U) FY 1993 Plans:

a. (U) Complete LARIP/PDI Land based and at-sea testing modifications to exploit SM-2(ER) Blk III capabilities.
b. (U) Continue design/development of modifications to correct deficiencies from testing and lessons learned from fleet operation.

5. (U) Program to Completion: This is a continuing program.

FY1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0604372N Budget Activity: 4
Program Element Title: TERRIER SM-2/NEW THREAT UPGRADE (NTU)
Project Number: S0188 Project Title: TERRIER SM-2/NTU

D. (U) WORK PERFORMED BY: IN-HOUSE: Fleet Combat Directions Systems Support Activity, Dam Neck, VA; Naval Surface Warfare Center, Dahlgren, VA; Naval Ship Weapon Systems Engineering Station, Pt. Hueneme, CA. CONTRACTORS: Johns Hopkins University, Applied Physics Laboratory, Laurel, MD; Vitro Corporation, Silver Spring, MD; Raytheon, Wayland, MA; Unisys Corp. Great Neck, NY; General Dynamics, Pomona, CA; FMC Naval Systems Division, Minneapolis, MN; E-Systems, ECI Division, St. Petersburg, FL; Republic Electronics, Hauppauge, NY.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. Technical Changes: Decrease the scope of FCS changes with BLK III/IIIA
2. Schedule Changes: Extend development of integrated pulse/Doppler Radar tracking capability.
3. Cost Changes: Cost reduction of $1224 decreases scope of fire control system changes with BLK III/IIIA. Additionally, the development effort of integrated pulse/Doppler Radar tracking capabilities would be extended.

F. (U) PROGRAM DOCUMENTATION:

TEMP 547	APR 87
Navy Training Plan (Engagement System)	SEP 88
Integrated Logistic Support Plan (084-4/5)	AUG 88
NDCP	FEB 81

G. (U) RELATED ACTIVITIES: Program Element 0604366N (Standard Missile Improvements) supports development of Standard Missile-2 Block III/IIIA round improvements.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

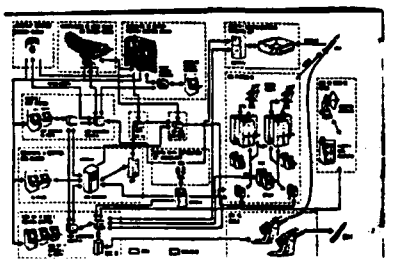
OPN #225(523200) TERRIER SUPPORT EQUIPMENT (includes TERRIER CG/SM-2, TERRIER NTU and Post-NTU improvements)

FY1990 Actual	FY1991 Estimate	FY1992 Estimate	FY1993 Estimate	To Complete	Total Program
25,537	14,413	19,424	20,481	Continuing	Continuing

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.
J. (U) TEST AND EVALUATION DATA: Not Applicable.

FY 1992 RDT&E, NAVY DESCRIPTIVE SUMMARY

Prog - Element: 0604372N Budget Activity: 4
Pro< Element Title: New Threat Upgrade
Pro_ c Number: S0964 Project Title: TARTAR SM-2/NTU



A.(U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	TO COMPLETE
Program Milestones					CONTINUING
Engineering Milestones	WDS CDR			WDS PDR CTS PDR	CONTINUING
T&E Milestones		DT-IIIE	DT-IIIF	DT IIIF OT-IIC	CONTINUING
Contract Milestones	COMPLETE CGN/NTU TESTS	INITIATE CGN-36 NTU TESTS	CONTINUE CGN-36 NTU TESTS	INITIATE MHIP & COMPLETE TESTS	CONTINUING

BUDGET ($K)	FY 1990	FY 1991	FY 1992	FY 1993	PROG. TOTAL TO COMPLETE
Major Contract	2,230	4,120	3,000	3,500	CONTINUING
Support Contract					
In-House Support	1,974	1,519	1,980	657	CONTINUING
GFE/ Other	164	98	100	100	CONTINUING
TOTAL	4,368	5,837	5,080	4,257	CONTINUING

Program Element: 0604372N Budget Activity: 4
Program Element Title: New Threat Upgrade
Project Number: S0964 Project Title: TARTAR SM-2/NTU

B.( ) DESCRIPTION:

This effort includes a continuation of development and adaptation of baseline CGN/SM-2 and New Threat Upgrade computer programs and related systems documentation for integration into the combat systems in TARTAR ships.

This project supports modification of the Anti-Air Warfare (AAW) engagement system to provide compatibility between the NTU detection system and the SM-2 Block III Missile to enhance performance against low altitude/crossing targets in a severe ECM environment.

C.( ) PROGRAM ACCOMPLISHMENTS AND PLANS:

1.(U) FY 1990 ACCOMPLISHMENTS:

a. Complete effort in developing modifications to correct deficiencies identified in CGN/NTU DT-IIID/OT-IIB in USS SCOTT (DDG-995).

b. Initiate contractor Integration Tests and DT-IIIE land-based testing of TARTAR Weapon System (CGN 36/NTU), which corrects deficiencies in ECCM performance, provides improved performance against low altitude crossing targets in severe ECM environment and provides compatibility with the SM-2 Block III Missile.

Program Element: 0604372N Budget Activity: 4
Program Element Title: New Threat Upgrade
Project Number: S0964 Project Title: TARTAR SM-2/NTU

2.(U) FY 1991 PROGRAM:

a. Continue and complete Contractor Integration Testing (CIT).

b. Analyze and correct CIT test deficiencies for DT-IIIE

c. Initiate and complete Development Test (DT)-IIIE at NCSTC.

d. Analyze and correct DT-IIIE test deficiencies for TRIAD preparation.

e. Initiate TRIAD testing at FCDSSA.

3 .(U) FY 1992 PLANS:

a. Complete TRIAD testing and initiate Integrated Combat System Testing at ICSTF.

b. Initial shipboard Development Testing DT-IIIF aboard CGN-36 to exploit SM-2 Blk III missile performance.

4.( ) FY 1993 PLANS:

a. Complete DT-IIIF aboard CGN-36.

b. Initiate Operational Test (OT)-IIC aboard CGN-36 to exploit SM-2 III missile performance.

c. Analyze and correct DT-IIIE/OT-IIC deficiencies.

d

5. (U) PROGRAM TO COMPLETION:

This is a continuing program to maintain a TARTAR Weapon Engagement System capable of countering the advancing threat and provide for:

a. Continue algorithm development for the MHIP,initiate and prepare MK 26 and MK 13 GMLS modifications, test plans and system documentation, perform Shore-Based, CIT, and Ship-Board testing and analyze/correct deficiencies.

b. Adaptation of computer programs and related systems documentation to exploit SM-2 missile performance improvements.

c. Development of TARTAR Weapons System improvements to correct deficiencies identified during Developmental and Operational testing of each ship class.

Program Element: 0604372N Budget Activity: 4
Program Element Title: New Threat Upgrade
Project Number: S0964 Project Title: TARTAR SM-2/NTU

D. (U) WORK PERFORMED BY: IN-HOUSE: Fleet Combat Directions Systems Support Activity, Dam Neck, VA; Naval Surface Warfare Center, Dahlgren, VA; Naval Ship Weapon Systems Engineering Station, Port Hueneme, CA. CONTRACTORS: Johns Hopkins University, Applied Physics Laboratory, Laurel, MD; Vitro Corporation, Silver Spring, MD; Raytheon, Waylan, MD; Unisys Corp. Great Neck, NY; General Dynamics, Pomona, CA; FMC Northern Ordnance, Minneapolis, MN; E-Systems, ECI Division, St. Petersburg, FL; Republic Electronics, Hauppauge, NY.

E. (U) COMPARISON WITH REVISED FY 1991 PRESIDENT'S BUDGET:

1. TECHNICAL CHANGES: Not Applicable.

2. SCHEDULE CHANGES: Not Applicable.

3. COST CHANGES: Not Applicable.

F. (U) PROGRAM DOCUMENTATION:

TEMP 731	FEB 88
Navy Training Plan (Engagement System)	MAY 88
Integrated Logistic Support Plan (306-P/D)	MAR 88
NDCP/D	FEB 81

G. (U) RELATED ACTIVITIES: Program Element 0604366N (STANDARD Missile Improvements) supports development of STANDARD Missile-2 Block II/IIIA round improvements. Program Element 0603382N (Battle Group AAW Coordination) develops improved Battle Force AAW coordination using AEGIS capabilities which includes SM-2/NTU ships.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

NOT APPLICABLE.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) TEST AND EVALUATION DATA: Not Applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604373N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AIRBORNE MINE COUNTERMEASURES
PROJECT NUMBER: W2047 PROJECT TITLE:ABN MINE DETECTION

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY1990 ACTUAL	FY1991 ESTIMATE	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W2047	ABN Mine	8,272	15,630	0	0	0	30,025

B. (U) DESCRIPTION: MAGIC LANTERN is a rapid prototype system designed to provide a near term Light Detection and Ranging (LIDAR) based Mine Counter Measures (MCM) capability to the fleet. It received Congressional funding in FY 90 to initiate a two year development effort for the system. The FY 1991 Appropriations Conference Report sited similarities between this program and the Marine Corps Standoff Mine Detection ATD, 0603640M C2079. Funds from both programs have since been combined into PE# 0603782N, budget activity 2, The "USN/USMC Joint Mine Detection Technology" program.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:

a. (U) Tested demonstrator at NCSC Panama City, Fl in May 1990.

b. (U) Signed contract with Kaman Aerospace Corp in Aug 90 to continue the development effort for the system.

2. (U) FY 1991 PROGRAM: The proposed program is a two and a half year technology demonstration to reduce the outyear acquisition risks of using LIDAR for mine detection and classification in a maritime environment. Both surf zone and deep water mines will be considered although most emhpasis is being placed on the surf mine problem due to its greater technical difficulty. Critical technical issues that will be addressed include:

a. **ENVIRONMENT-**bottom clutter rejection, adaptability to varying target shapes, sizes, optical properties, and distributions, and adaptability to varying sea states and ambient light conditions.

b. **OPTIC-**laser spot size, pulse repetition frequency, receiver resolution, and data rate and scanner off-angle capability.

c. **PROCESSING-**false alarm rate and bottom tracking requirements.

Anticipated outcomes include:

a. assessment of rapid prototype for USN deep sea mines,

b. determination of whether rapid prototying will solve surf zone problems, and

c. technical requirements for the follow-on acquisitions.

D. (U) WORK PERFORMED BY:IN-HOUSE: Office, Chief of Naval Research, Arlington VA; Marine Corp Research, Development, Acquisition Command, Quantico, VA; NCSC, Panama City, FL; CONTRACTORS: Kaman Aerospace Corporation, Bloomfield, CT. Univ. of Washington/APL, Seattle, WA.

E. (U) RELATED ACTIVITIES: 0603640M C2079 Standoff Mine Detection ATD

F. (U) OTHER APPROPRIATION FUNDS: None.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604502N **BUDGET ACTIVITY:** 4-Tactical Programs
PROGRAM ELEMENT TITLE: Submarine Communications
A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPL	TOTAL PROGRAM
S0742	Submarine Integrated Antenna System	6,152	9,626	11,820	10,264	Cont.	Cont.
S1411	Attack Submarine Integrated Communications	600	1,673	2,213	2,036	Cont.	Cont.
	TOTAL	6,752	11,299	14,033	12,300	CONT.	CONT.

B. (U) DESCRIPTION: The Submarine Integrated Antenna Systems project develops the antennas needed to communicate in new networks such as Ultra-High-Frequency Satellite Communications, Extremely-Low-Frequency (ELF), Extremely-High-Frequency (EHF), and Global Positioning System. Hardware developments include: (a) mast-mounted systems; (b) buoyant cable systems; (c) expendable buoy systems, and (d) towed buoy systems. The objectives of the Attack Submarine Integrated Communications Systems project are to provide attack submarines, specifically the LOS ANGELES and SEAWOLF Classes with an exterior communications system which (a) minimizes time required at communications depth, (b) enhances operability, reducing errors and manpower requirements, and (c) provides flexibility for low impact growth and change throughout the life of the submarine. Design efforts will provide increased time and frequency distribution, antenna signal distribution, and interconnection subsystems to accommodate ELF, EHF, and Mini-Demand Assigned Multiple Access (DAMA) and a message storage and processing subsystem.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604502N BUDGET ACTIVITY: 4-Tactical Programs
PROGRAM ELEMENT TITLE: Submarine Communications
PROJECT NUMBER: S0742 PROJECT TITLE: Submarine Integrated Antenna Systems

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY1990 ACTUAL	FY1991 ESTIMATE	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPL.	TOTAL PROGRAM
S0742	SIAS	6,152	9,626	11,820	10,264	CONT.	CONT.

B. (U) DESCRIPTION: The purpose of this project is to provide submarines with antenna systems designed to (a) permit greater operational flexibility through improved speed/depth performance; (b) improve reliability and availability; and (c) be compatible with existing and emerging communications systems.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. (U) Completed development of AN/BRA-34 DAMA upgrade.
   b. (U) Started development of the Arctic Buoy.
   c. (U) Completed PDR of improved AN/BRA-34.
   d. (U) Conducted at sea testing of improved towed buoy high lift auxiliary wire antenna.
   e. (U) Started development of the High Speed Buoyant Cable Antenna.
   f. (U) Started development of the EHF Antenna.
2. (U) FY 1991 Program:
   a. (U) Complete Milestone II for Arctic Buoy; issue EDM contract.
   b. (U) Award EDM contract for AN/BST-1 upgrade.
   c. (U) Complete development of improved towed buoy auxiliary wire antenna.
   d. (U) Continue development of improved AN/BRA-34.
   e. (U) Continue development of the EHF Antenna.
   f. (U) Continue development of the High Speed Buoyant Cable Antenna.
   g. (U) Complete CDR of improved AN/BRA-34.
3. (U) FY 1992 Plans:
   a. (U) Complete Milestone II for EHF Antenna.
   b. (U) Complete development of High Speed Buoyant Cable Antenna.
   c. (U) Start Test and Evaluation (DT-IIA) of Arctic Buoy.

PROGRAM ELEMENT: 0604502N BUDGET ACTIVITY: 4-Tactical Programs
PROGRAM ELEMENT TITLE: Submarine Communications
PROJECT NUMBER: S0742 PROJECT TITLE: Submarine Integrated Antenna Systems

d. (U) Conduct CDR for the AN/BST-1 upgrade.
e. (U) Start development of a High Strength Tow Cable for towed buoys.
f. (U) Complete development of improved AN/BRA-34.

4. (U) FY 1993 Plans:
a. (U) Complete Test and Evaluation (DT-IIA) of the Arctic Buoy.
b. (U) Conduct Technical Evaluation (TECHEVAL) (DT-IIB) of the Arctic Buoy.
c. (U) Conduct TECHEVAL (DT-IIB) of the AN/BST-1 upgrade.
d. (U) Issue contract for the EHF antenna EDM.
e. (U) Complete Milestone III for High Speed Buoyant Cable Antenna.
f. (U) Complete Development of a High Strength Tow Cable for towed buoys.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NUSC, New London, CT;
CONTRACTORS: Spears associates, Norwood MA and others to be determined.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
1. (U) TECHNOLOGY CHANGES: NONE
2. (U) SCHEDULE CHANGES: NONE
3. (U) COST CHANGES: NONE

F. (U) PROGRAM DOCUMENTATION:

SIAS NDCP	3 Mar 80
Arctic Buoy TEMP	28 Sep 90
Improved AN/BRA-34 Antenna PCAD	17 MAR 89

G. (U) RELATED ACTIVITIES: NONE

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

APPN/P-1	FY1990 ACTUAL	FY1991 ESTIMATE	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
OPN#132 (3130)	8,283	9,741	12,385	7,603	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE

J. (U) MILESTONE SCHEDULE: NOT APPLICABLE

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604502N **BUDGET ACTIVITY:** 4-Tactical Programs
PROGRAM ELEMENT TITLE: Submarine Communications
PROJECT NUMBER: S1411 **PROJECT TITLE:** Attack Submarine Integrated Communications

C. (U) DESCRIPTION: The purpose of the Attack Submarine Integrated Communication System project is to provide attack submarines with communications systems designed to (a) enhance data throughput; (b) copy tactical data networks such as TADIXS (Tactical Data Information Exchange System); (c) be interoperable with other U.S. and allied military networks; and (d) improve reliability, maintainability and availability. This can be accomplished by providing the attack submarine with a properly integrated mix of Navy standard communications equipment covering a wide range of frequencies and modes.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. (U) Refined Antenna Distribution Subsystem and Time-Frequency Distribution Subsystem specification.
   b. (U) Developed Message Processing System "A" Specification.
   c. (U) Evaluated Message Processing System prototype software and hardware candidates.
2. (U) FY 1991 PROGRAM:
   a. (U) Complete development and test of Message Processing System software.
   b. (U) Evaluate Time-Frequency Distribution Subsystem candidates.
   c. (U) Evaluate EHF ephemeris data bulk storage candidates.
   d. (U) Develop Message Processing System T&E Evaluation Plan (TEMP).
   e. (U) Conduct Message Processing System testing on R&D Submarine.
   f. (U) Complete Message Processing System Milestone III.
3. (U) FY 1992 PLANS:
   a. (U) Award contract for Message Processing System source hardware.
   b. (U) Evaluation EHF ephemeris data bulk storage hardware.
4. (U) FY 1993 PLANS:
   a. (U) Evaluate covert reporting candidates.
   b. (U) Evaluate radio room miniaturization, integration and automation systems and candidate equipments.
5. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NUSC, New London, CT; NAVOCEANSYSCEN, San Diego, CA; and NAVELEXCEN, Charleston, SC. CONTRACTORS: Magnavox, Philadelphia, PA; AVW, Inglewood, CA; Delta Electronics, Alexandria, VA; ECI, St. Petersburg, FL.

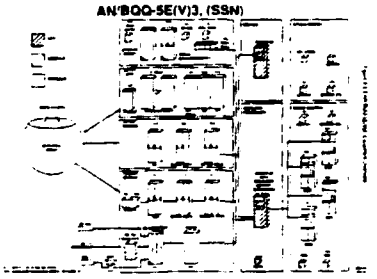
F. (U) RELATED ACTIVITIES: None

G. (U) OTHER APPROPRIATION FUNDS: Funds are included under P1 line Item #132 OPN (3130) in RDT&E Project S0742 for this PE.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE POSITION

PROGRAM ELEMENT: 0604503N **BUDGET ACTIVITY:** 4-Tactical Programs
PROGRAM ELEMENT TITLE: Submarine Sonar Improvements (Engineering)
PROJECT NUMBER: S0219 **PROJECT TITLE:** Submarine Sonar Improvements
POPULAR NAME: Submarine Sonar System (Engineering)



A. (U) SCHEDULE/BUDGET INFORMATION:(Dollars in Thousands)

SCHEDULE		FY 1990	FY 1991	FY 1992	FY 1993	TO COMPLETE
PROGRAM MILESTONES	Q-5E	IIIA1 12/89	IIIA2 1/91	IIIA3 1/92	III 8/93	
	TB-29 ARRAY		IIIA1 1/91	IIIA2 1/92	III 8/93	
	Q-5( )/ 688I			12/91 Design Definition Complete	12/92 ARB, FSD 5/93 NPDM, FSD	2Q/95 IIIA1 2Q/96 IIIA2 2Q/97 IIIA3
Engineering Milestones	Q-5E	12/89 Final H/W Spec	12/90 EDM	5/92 SDCT	12/92 Final S/W Drop	
	TB 29 ARRAY Q-5( )/688I		6/91 CDR	11/92 EDM		3Q/94 Final H/W Spec 4Q/96 SDCT
T&E Milestones	Q-5E				1/93 TECHEVAL 4/93 OPEVAL	
	TB-29 ARRAY Q-5( )/ 688I	SEA TEST 12/89				TECHEVAL 1Q/97 OPEVAL 2Q/97
CONTRACT MILESTONES	Q-5E	Award LRIP 2/90	Award LRIP 3/91	Award LRIP 1/92		
	TB-29 ARRAY Q-5E( )/ 688I Q-5( )/ 688I	Award FSD 6/90	Award LRIP 3/91	Award LRIP 3/92	5/93 Award FSED	Award LRIP 2Q/95,96,97

FY 1992/3 RDT&E, NAVY DESCRIPTIVE POSITION

PROGRAM ELEMENT: 0604503N **BUDGET ACTIVITY:** 4-Tactical Programs
PROGRAM ELEMENT TITLE: Submarine Sonar Improvements (Engineering)
PROJECT NUMBER: S0219 **PROJECT TITLE:** Submarine Sonar Improvements

BUDGET ($K)	FY 1990	FY 1991	FY 1992	FY 1993	Program Total To Complete
Major Contract	18286	31909	35545	33158	CONTINUING
Support Contract	1060	1004	717	173	CONTINUING
In-House Support	6085	5516	5092	6560	CONTINUING
GFE/ Other	150	150	140	150	CONTINUING
TOTAL	25581	38579	41494	40041	CONTINUING

B. (U) DESCRIPTION: The future operating environment and mission requirements of the submarine force will increase the demands on acoustic detection, localization, and tracking in Antisubmarine Warfare (ASW), Antisurface Warfare (ASUW), Barrier, Escort and other mission areas. These requirements have necessitated developing improvements to acoustic processing, and sensor integration. This program delivers these block updates to the submarine sonar systems onboard SSN 688, and TRIDENT class submarines. These improvements are vital to counter the threat of advanced classes of enemy submarines. The threat possesses significantly reduced radiated noise levels and improved sonar detection capabliity. Each hardware and software update is embodied in a block change package, such that the Combat System as a whole can capitalize on synergism of the individual improvements. The AN/BQQ-5E with TB-29 array will provide a quantum improvement in long range detection, localization, for all platforms and significantly enhance the defensive capability of TRIDENT SSBN's. Future improvements will address the integration of Low Frequency Active (LFA), TAP, ICDC Improvement with color display, dual towed array processing and Full Spatial Vernier Processing (SVP) for TB-29 Array. These will be encompassed in the AN/BQQ-5( )/688I effort.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. (U) Finalized Hardware Specification for AN/BQQ-5E. MSIIIA1 approval.
   b. (U) Continued upgrade of acoustic measurement equipment.
   c. (U) Awarded FSD Contract for TB-29 Array.

2. (U) FY 1991 Program:
   a. (U) Continue development of AN/BQQ-5E. MSIIIA2 approval.
   b. (U) Continue TB-29 development. Complete critical design review for TB-29 Array. MS IIIA1 approval
   c. (U) Complete AN/BQQ-5E EDM.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE POSITION

PROGRAM ELEMENT: 0604503N **BUDGET ACTIVITY:** 4-Tactical Programs
PROGRAM ELEMENT TITLE: Submarine Sonar Improvements (Engineering)
PROJECT NUMBER: S0219 **PROJECT TITLE:** Submarine Sonar Improvements

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS (con't):

3. (U) FY 1992 Plans:
   a. (U) Continue development of AN/BQQ-5E. MSIIIA3 approval.
   b. (U) SDCT for AN/BQQ-5E complete.
   c. (U) Continue development of TB-29 Array. Complete TB-29 EDM.
   d. (U) Complete Design Definition for Q5( )/688I Effort.
   e. (U) On-board Trainer development begins.

4. (U) FY 1993 Plans:
   a. (U) Techeval/Opeval for AN/BQQ-5E Complete. MSIII approval obtained for AN/BQQ-5E and TB-29 Array.
   b. (U) Complete Acquisition Review Board (ARB) and Navy Program Decision Memorandum (NPDM) for FSD of AN/BQQ-5( )/688I.
   c. (U) Award FSD contract for AN/BQQ-5( )/688I effort.
   d. (U) Continue On-board Trainer development.

5. (U) Program to Completion:
   This is a continuing effort. The major out year milestones include:
   a. (U) Continue development of AN/BQQ-5( )/688I. Annual milestone approval anticipated.
   b. (U) Complete TECH/OPEVAL for AN/BQQ-5( )/688I program.
   c. (U) Complete On-board Trainer development.

6. (U) This is a continuing effort.

D. (U) WORK PERFORMED BY: In-house: PEO-SCWS (PMO409), Washington, DC; NUSC, New London, CT; Naval Weapons Support Center, Crane, IN; COMOPTEVFOR, Norfolk, VA; and NOSC, San Diego, CA. Contractors: International Business Machines Corp., Systems Integration Division, Manassas, VA; Martin Marietta, Ocean Systems Operation, Glen Burnie, MD; EG&G, Washington Analytical Services Center, Inc., Rockville, MD.

E. (U) COMPARISON WITH REVISED FY 1991 PRESIDENT'S BUDGET
1. (U) Technical changes: None.
2. (U) Schedule changes: Due to the availability of the test platform, Tech/OPEVAL slipped from 1st Qtr to 2nd Qtr FY 93.
3. (U) Cost changes: None.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE POSITION

PROGRAM ELEMENT: 0604503N BUDGET ACTIVITY: 4-Tactical Programs
PROGRAM ELEMENT TITLE: Submarine Sonar Improvements (Engineering)
PROJECT NUMBER: S0219 PROJECT TITLE: Submarine Sonar Improvements

F. (U) PROGRAM DOCUMENTATION:

NDCP S0219 - as approved	2Q/86
TEMP 137-8 Rev 1	1Q/90
TEMP 137-8 Rev 2	TBD
Acquisition Plan 424-87 (CHANGE 2)	2Q/90

G. (U) RELATED ACTIVITIES: PE 0604524N - Submarine Combat System Development and PE 0604561N - SSN-21.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

APPN	FY 1990	FY 1991	FY 1992	FY 1993	TO	TOTAL
PROCUREMENT (BA 2)	ACTUAL	ESTIMATE	ESTIMATE	ESTIMATE	COMPLETE	PROGRAM
AN/BQQ-5 Sonar System	84,695	115,720	132,593	139,595	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None

J. (U) TEST AND EVALUATION DATA: NOT APPLICABLE TO THIS SUBMISSION.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604504N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AIR CONTROL (ENGINEERING)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMP	PROGRAM TOTAL
W0993	Carrier Air Traffic Control	2,411	3,292	913	1,043	Cont.	Cont.
W1579	LPH/LHA Air Traffic Control	570	0	0	0	0	12,600
W1657	Air Traffic Control Improvements	4,989	6,287	6,888	10,991	Cont.	Cont.
W1680	Multi-Mode Receiver	7,856	2,474	407	0	0	36,557
X0718	Marine Air Traffic Control Landing System	3,149	3,675	2,354	2,968	Cont.	Cont.
TOTAL		18,975	15,728	10,562	15,002	Cont.	Cont.

B. (U) DESCRIPTION: This program element provides for the development, integration, and testing of automated Air Traffic Control (ATC) hardware and software required to provide improved flight safety, support more reliable all-weather ATC and landing capabilities ashore and afloat, and decrease Low Probability of Intercept radiated electromagnetic energy from ATC radars. The new systems are required to replace obsolete ATC and approach/landing equipment on aircraft, aircraft carriers, amphibious ships, Naval Air Stations, and Navy/Marine Corps tactical/expeditionary airfields and remote landing sites.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604504N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AIR CONTROL (ENGINEERING)

PROJECT NUMBER: W0993 PROJECT TITLE: CARRIER AIR TRAFFIC CONTROL

C. (U) DESCRIPTION: Shipboard Air Traffic Control Centers identify, marshal and direct aircraft within 50 nm to a ships Automatic Carrier Landing System (ACLS) and Independent Landing Monitor (ILM). The Precision Approach Radar and Independent Landing Monitor then provide precise automatic control and verification of aircraft during their final approach and landing sequence. Low Probability of Intercept (LPI) is required to enable aviation ships to conduct operations while preventing opposing forces from exploiting the unique radar signature of the ship.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. (U) Conducted OPEVAL of AN/SPN-46(V).
   b. (U) Obtained Approval for Full Rate Production (AFRP).
2. (U) FY 1991 Program:
   a. (U) Complete software recompile of AN/SPN-46(V) software program.
   b. (U) Continue full production of AN/SPN-46(V).
3. (U) FY 1992 Plans:
   a. (U) Complete AN/SPN-46(V) software documentation deliveries from FSD contract.
4. (U) FY 1993 Plans:
   a. (U) Begin initial FSD preparation for Signature Managed Air Traffic Control and Landing System (SMATCALS) in preparation for transition from advanced development to full scale development.
5. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: COMNAVAIRSYSCOM, Washington, DC; NAVELEXACT, St. Inigoes, MD; NAVAIRTESTCEN, Patuxent River, MD; NWSC, Crane, IN; NAVAVIONICCEN, Indianapolis, IN; NRL, Washington, DC. CONTRACTOR: Bell Aerospace Textron, Inc., Buffalo, NY.

F. (U) RELATED ACTIVITIES: Not Applicable

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE
(U) PROCUREMENT:					
APPN/P-1	7,674	717	37,524	15,682	Continuing
OPN/#100					

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604504N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AIR CONTROL (ENGINEERING)
PROJECT NUMBER: W1657 PROJECT TITLE: ATC IMPROVEMENTS

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 90 ACTUAL	FY 91 ESTIMATE	FY 92 ESTIMATE	FY 93 ESTIMATE	TO COMP	TOTAL PROGRAM
W1657	Air Traffic Control Improvements	4,989	6,287	6888	10,991	Cont.	Cont.

B. (U) DESCRIPTION: This program provides for the development, integration, adaptation, and testing of new and/or modernized real-time Air Traffic Control (ATC) systems, air navigational aids and landing systems, ATC communications systems i.e., FACSFAC and Ranges must be modified to ensure continued interoperability with the National Airspace System (NAS).

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:
1. (U) FY 1990 Accomplishments:
a. (U) Initiated the Top Level Program Concept, structure and management guidelines.
b. (U) Commenced functionality studies for the Navy subsystems and interfaces that will be required for the Navy to remain interoperable with the FAA.
2. (U) FY 1991 Program:
a. (U) Develop program management review documents and the security, data and design guidance documents.
b. (U) Develop engineering and logistics documents to set equipment design goals and delineate maintenance and repair philosophy.
c. (U) Conduct alternative studies against the functional requirements beginning with existing NDI equipment and new or emerging technologies.
3. (U) FY 1992 Plans:
a. (U) Update initial functionality studies as force structure changes occur.

PROGRAM ELEMENT: 0604504N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AIR CONTROL (ENGINEERING)
PROJECT NUMBER: W1657 PROJECT TITLE: ATC IMPROVEMENTS

b. (U) Conduct market investigation and commercial/NDI trade-off analysis.
c. (U) Develop detailed acquisition strategy.
d. (U) Develop system interface requirement documents and draft system specifications.

4. (U) FY 1993 Plans:
a. (U) Update engineering and ILS documents.
b. (U) Initial contract award for subsystems and interface equipment, IV&V cost review.
c. (U) Begin installation and integration planning.

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: COMNAVAIRSYSCOM, Washington, DC; NAVELEXCEN, Charleston, SC; NAVELEXCEN, Vallejo, CA; NAVELEXACT, St. Inigoes, MD; NAVAIRTESTCEN, Patuxent River, MD; NAVOCEANSYSCEN, San Diego, CA; NAVAIRDEVCEN, Philadelphia, PA; NAVAVIONICCEN, Indianapolis, IN; SODIVNAVFAC, Charleston, SC; CONTRACTOR: TBD.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
1. (U) Technology Changes: Not Applicable.
2. (U) Schedule Changes: Not Applicable.
3. (U) Cost Changes: Not Applicable.

F. (U) PROGRAM DOCUMENTATION:

TOR	12/89
OR	12/91
TEMP	10/92
AP	6/93 (FSD)
	10/97 (PROD)

G. (U) RELATED ACTIVITIES: NONE

H. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE:
M/S III - 2/98

PROGRAM ELEMENT: 0604504N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AIR CONTROL (ENGINEERING)
PROJECT NUMBER: W1680 PROJECT TITLE: MULTI-MODE RECEIVER

C. (U) DESCRIPTION: This project provides for development of a Multi-Mode Receiver (MMR) for use in Navy/Marine Corps aircraft to insure compatibility with the future Federal Aviation Administration National Microwave Landing System, Civil Instrument Landing Systems, Navy/Marine Corps unique Automatic Carrier Landing System (ACLS), and the Marine Remote Area Approach and Landing System (MRAALS). In the ACLS application only, MMR provides an Independent Landing Monitor for the primary system. In other applications it is the primary and only precision landing indicator in the aircraft. Without MMR, Navy and Marine Corps tactical aircraft will have no precision indicating system compatible with any other system worldwide except ACLS. Further development includes a Low Probability of Intercept (LPI) capability for the MMR.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. (U) Completed preproduction design approval tests.
   b. (U) Completed integration efforts on F/A-18 and CH-53.
   c. (U) Began TECHEVAL of MMR in F/A-18 and CH-53.
2. (U) FY 1991 Program:
   a. Complete TECHEVAL on F/A-18 and CH-53.
   b. Commence and complete OPEVAL on F/A-18.
   c. Commence OPEVAL on CH-53.
3. (U) FY 1992 Plans: Complete OPEVAL on CH-53.
4. (U) FY 1993 Plans: Not Applicable.
5. (U) Program to Completion: FY 1992 completes the RDT&E phase of this program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRDEVCEN, Warminister, PA; NAVAIRTESTCEN, Patuxent River, MD; NAVAVIONICCEN, Indianapolis, IN. CONTRACTOR: Plessey Electronic Systems, Wayne, NJ.

F. (U) RELATED ACTIVITIES: Development in both the Marine Air Traffic Control and Landing System and AN/SPN-46(V) Automatic Carrier Landing System projects has been coordinated with the National Microwave Landing System objectives of the FAA.

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

PROGRAM ELEMENT: 0604504N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AIR CONTROL
PROJECT NUMBER: X0718 PROJECT TITLE: MATCALS

C. (U) DESCRIPTION: Provides for continued development, integration, and testing of hardware and software (S/W) to meet requirements for all-weather Air Traffic Control and automated landing systems at Navy/Marine Corps expeditionary airfields.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:

a. (U) Successfully completed devel. testing of AN/TPS-73 radar(6-90). Commenced OPEVAL testing of AN/TPS-73 (8-90).

b. (U) Commenced development of software for required TADIL-B/C/J capability.

c. (U) Commenced studies for Advanced Air Traffic Control.

2. (U) FY 1991 PROGRAM: Continue development and testing of required operational capabilities, including tactical data links. Commence tests of airborne receiver. Continue studies for Advanced Air Traffic Control.

3. (U) FY 1992 PLANS: Commence tests of down-link capability, flight- control and flight-safety software. Complete Advanced Air Traffic Control Studies. 4. (U) FY 1993 PLANS: Continue testing of software for down-link capability, flight-control, and flight-safety software.

5. (U) PROGRAM TO COMPLETION: This is a continuing program. It is planned to develop improvements in hardware and software to increase operational availability and flight saftety, e.g. Clear Air Turbulance warning mode.

E. (U) WORKED PERFORMED BY: IN-HOUSE: SPAWAR (Wash, DC); NESEC (Vallejo, CA); NESEA (St Inigoes, MD); NATC (Patuxent River, MD) CONTRACTOR: UNISYS Corp (Great Neck, NY); UNISYS (St Paul, MN); Plessey (Wayne, NJ), GTRI (Atlanta, GA)

F. (U) RELATED ACTIVITIES: NONE

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

(U) PROCUREMENT:	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMP	TOTAL PROGRAM
APPN/P-1 OPN/#106	14,121	11,493	4,172	3,835	20,700	55,100

(U) MILCON: N/A

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable

FY 1992/3 RDT&E NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604506N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Chemical Warfare Countermeasures
PROJECT NUMBER: S0410 **PROJECT TITLE:** BR/CW Countermeasures

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0410	BR/CW Countermeasures	6482	8540	5597	5764	Cont.	Cont.

B. (U) DESCRIPTION: Develop chemical, biological and radiological (CBR) defensive systems required to counter threats in the near term (1990's) and predicted emerging threats in the post 2000 time frame. Includes individual and collective protection, detection and monitoring, and decontamination materials and equipment.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:
   a. (U) Completed DT-II TECHEVAL for Chemical Agent Monitor (CAM), Shipboard and Selected Area Collective Protection Systems (CPS).
   b. (U) Completed TEMP revision, test plans and training documentation for DT-IID (TECHEVAL) of Shipboard CPS.
2. (U) FY 1991 PROGRAM:
   a. (U) Conduct OPEVAL of CAM, Shipboard and Selected Area CPS.
   b. (U) Initiate DT-II of Improved Point Detector (IPD).
3. (U) FY 1992 PLANS:
   a. (U) Conduct TECHEVAL of IPD, hold MS-II reviews for Shipboard Automatic Liquid Agent Detector (SALAD), Chemical Agent Remote Detection System (CARDS), and Advanced Chemical Protective Overgarment (ACPO).
4. (U) FY 1993 PLANS:
   a. (U) Conduct OPEVAL of IPD, continue development of SALAD, CARDS and ACPO. Hold MS-II review for Chemical Warfare Interior Compartment Sensor (CWICS).
5. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSWC, Dahlgren, VA; DTRC, Bethesda, MD; NCTRF, Natick, MA; NAEC, Lakehurst, NJ; NRL, Washington, DC. CONTRACTORS: Nuclear Research Corp., Philadelphia, PA; J.J. McMullen & Battelle, Washington, DC; Brunswick Corp., Clearwater, FL; Donaldson Corp., Minneapolis, MN.

E. (U) RELATED ACTIVITIES: Program Elements 0603514N Ship Combat Survivability; 0602233N Mission Support Technology.

F. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
OPN1810LI0989	13,438	17,973	8,544	8,218	Cont.	Cont.
OPN1810LI9020	26,603	22,950	5,098	12,420	Cont.	Cont.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0604507N Budget Activity: 4
Program Title: Navy Standard Signal Processor (NSSP)
Project Number: S1440 **Project Title:** Enhanced Modular Signal Processor (EMSP)

A. (U) RESOURCES: (Dollars in Thousands)

Project Number	Title	FY 1990 Actual	FY 1991 Estimate	FY 1992 Estimate	FY 1993 Estimate	To Complete	Total Program
S1440	EMSP	27,812	19,852	9,266	9,262	Cont.	Cont.

B. (U) DESCRIPTION: The EMSP is a general purpose programmable signal processor which will provide increased signal processing capability for ASW weapon systems.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Began Standard Electronic module (SEM) B Production, began Matrix Processor (MP) Advanced Development (Phase I), continued delivery of SEM B Development Test Equipments, continued functional model repackaging and Ada transition, delivered first SEM E Engineering Development Model and Initial Software package, commenced development efforts for SEM E unique items, held a Requirements Design Review for SEM E unique items, received SEM B Approval for Low Rate Initial Production (ALRIP) (MS IIIA), conducted CDR for the SEM E P3 UDIV enclosure, and began delivery of SEM E Service Test Models (STMs).

2. (U) FY 1991 PROGRAM: Commence *SEM E DT-IID* testing, complete MP Phase I and commence Phase II (FSED), achieve SEM E ALRIP (MS IIIB), begin deliveries of SEM B Production units, continue development of SEM E unique items, and deliver interim SURTASS/LFA CXP integrated unit.

3. (U) FY 1992 Plans: Complete SEM E DT-IID testing, complete delivery of STMs, complete SEM E FSED, achieve SEM E AFP (M/S IIIC), continue MP development, continue development of SEM E unique items, and begin investigations for upgrading AN/UYS-2.

4. (U) FY 1993 Plans: Continue MP development, complete development of SEM E unique items, continue new upgrades effort, and begin study to insert Very High Speed Integrated Circuit (VHSIC) Sub-Micron technology.

5. (U) Program to Completion: This is a continuing program.

D. (U) WORKED PERFORMED BY: IN-HOUSE: NUSC, NL; NWSC; NADC; NRL; NOSC. CONTRACTORS: AT&T Federal Systems Business Unit, Greensboro, NC.

E. (U) RELATED ACTIVITIES: All ASW programs using standard signal processors, including AN/BSY-2 (PE 0604524), P-3 Update IV (PE 0604211), SURTASS (PE 0603533), AN/SQQ-89 (0604575), ALFS, and LFA.

F. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 Actual	FY 1991 Estimate	FY 1992 Estimate	FY 1993 Estimate	To Complete	Total Program
(U) OPN, (332975)	8,185	2,780	3,442	4,467	Cont.	Cont.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604508N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Radar Surveillance Equipment
PROJECT NUMBER: S0166 PROJECT TITLE: SPS Improvement Program

A. (U) RESOURCES: (Dollar in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROG.
S0166	SPS Improvement Program	3,435	4,631	8,043	8,182	CONT.	CONT.

B. (U) DESCRIPTION: This program develops and tests performance and reliability upgrades for search radars and Integrated Auto-Detect/Track (IADT) Systems to meet evolving threats.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:
   a. (U) Completed Phase I APQ-164 Radar Critical Experiment
   b. (U) Continued development/testing of SYS-2(V)2, FFG-61
   c. (U) Completed preparation of Development Option Paper (DOP) for Ship Sensor Integrated Display System (SSIDS).
   d. (U) Evaluated SPS-49 Medium PRF Upgrade (MPU)
   e. (U) Studied Anti-Ship Missile Defense (ASMD) Horizon Emphasis radar options
2. (U) FY 1991 PROGRAM:
   a. (U) Continue DT and OT for SYS-2(V)2 on FFG-61
   b. (U) Improve SYS-2(V) series capabilities (IFF, EO, ESM)
   c. (U) Complete SPS-49 MPU/DSLC development/test
   d. (U) Build/test ASMD Horizon Emphasis Modules
   e. (U) Continue modifications to SPS-67/49 IFF antenna for ESM
3. (U) FY 1992 PLANS:
   a. (U) Continue development/test of ASMD Horizon Emphasis radar
   b. (U) Continue SYS-2(V) Series Improvements (IFF, EO, ESM)
4. (U) FY 1993 PLANS:
   a. (U) Begin FSED of ASMD Horizon Emphasis radar
   b. (U) Continue SYS-2(V) Series Improvements (IFF, EO, ESM)
5. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSWC, Dahlgren VA; NRL, Washington, DC; NOSC, San Diego, CA. CONTRACTORS: Raytheon, Wayland, MA; JHU/APL, Laurel, MD; ITT Gilfillan, Van Nuys, CA; Westinghouse, Baltimore, MD; Norden Systems, Melville, NY.

E. (U) RELATED ACTIVITIES: PE 0604307N, Aegis CSE; PE 0604372N, NTU; PE 0603319N, NATO AAW Systems; PE 0604211N, IFF Systems Development; PE 0604301N, MK-92 FCS Upgrade.

F. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROG
.(U) PROCUREMENT:						
OPN: P1 Line Items 48, 49, 50, 51	63,264	28,851	79,416	32,018	CONT.	CONT.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604514N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Navigation Systems
PROJECT NUMBER: S0253 PROJECT TITLE: Navigation Systems

A. (U) RESOURCES: (Dollars in thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROG
S0253	NAVIG. SYSTEMS	4,712	5,314	4,132	2,989	CONT.	CONT.

B. (U) DESCRIPTION: The Photonics Mast will exploit a wide range of the electromagnetic spectrum utilizing advanced electro-optical imaging, fiber optics, and electronic support measures. The sensors will be mounted on a non-penetrating periscope and information will be passed through the hull using simple electrical connections. The Photonics Mast will be tactically superior to all current periscopes in the U.S. Navy inventory.

(U) The Doppler Sonar Velocity Log (DSVL) is a high accuracy velocity meter being developed for precise measurement of own ship's relative and absolute speed. The DSVL will minimize speed errors being introduced into the fire control solution. The system will provide ship's relative speed and speed over ground on 3 axes.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments::
   a. (U) Completed threat assessment and requirement analysis for Photonics Mast.
   b. (U) Developed Photonics Mast concept definition detailed technical specification.
   c. (U) Prepared Photonics Mast concept definition RFP.
   d. (U) Reinitiated DSVL program & conducted DSVL prism transducer study.
   e. (U) Upgraded DSVL Detectability Instrumentation.
   f. (U) Updated DSVL TEMP, ILSP, and NTP.
   g. (U) Generated PR for DSVL development effort.
2. (U) FY 1991 Program:
   a. (U) Award Photonics Mast concept definition contracts.
   b. (U) Develop Photonics Mast Type A Specification.
   c. (U) Prepare Photonics Mast FSED RFP.
   d. (U) Prepare DSVL RFP and award DSVL EDM contract.
   e. (U) Develop DSVL Prism Transducer and update DSVL electronics.
3. (U) FY 1992 PLANS:
   a. (U) Award Photonics Mast FSED contract.
   b. (U) Conduct DSVL Factory Acceptance Test.
   c. (U) Install DSVL on TECHEVAL test ship and conduct system checkout and groom.
4. (U) FY 1993 PLANS:
   a. (U) Exercise options for first and second Photonics Mast EDMs.
   b. (U) Conduct Photonics Mast Preliminary Design Review.
5. (U) Program to Completion: This is a continuing program.

D. (U) Work Performed By: IN-HOUSE: Naval Underwater Systems Center/New London Lab, New London, CT; Naval Air Development Center, Warminster, PA; Naval Ocean Systems Center, San Diego, CA; Naval Ship Systems Engineering Station, Philadelphia, PA; David Taylor Naval Research and Development center. CONTRACTORS: Hughes, Los Angeles, CA; Sperry Marine Inc., Charlottesville, VA; Kollmorgen Corp., Northampton, MA; Honeywell, Minneapolis, MN; Northrop-Anaheim, CA.

E. (U) RELATED ACTIVITIES: 0603226E Experimental Evaluation of Innovative Technology. Non-penetrating periscope being developed by DARPA.

F. (U) Other Appropriation Funds: (Dollars in Thousands)

APPN/P-1 (U) PROCUREMENT	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
SCN/BLT #12	0	7,253	0*	0*	CONT.	CONT.

* No new procurement until 1993

G. (U) International cooperative agreements: None

FY 1992 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604515N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Submarine Surveillance Support Program
PROJECT NUMBER: S0775 **PROJECT TITLE:** Submarine Surveillance Support Program

A. (U) RESOURCES: (Dollars in thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMP	TOTAL PROGRAM
S0775	SSSP	10,512	5,620	18,901	27,799	CONT	CONT

B. (U) DESCRIPTION: This program improves Electronic Support Measures (ESM) techniques, components, equipment, and systems for submarines to provide threat warning, direction finding, over-the-horizon targeting support (OTH-T), and tactical surveillance/data collection. Also develops periscope and mast modification kits to reduce vulnerability to detection by radar.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. (U) Completed repackaging and quieting SEA NYMPH for SSN 21 Class.
   b. (U) Terminated the AN/BLQ-9 program per Congressional direction.
   c. (U) Began development of improved Radar Cross-section Reduction (RCSR) radome for AN/BRD-7 antenna.
   d. (U) Completed development of the data processing equipment subsystem (DPES) upgrade.
   e. (U) Began full scale development of an Integrated ESM Mast (IEM) for submarine ESM systems.

2. (U) FY 1991 Program:
   a. (U) Generate procurement package (including specifications) for upgrades to the AN/WLQ-4(V)1 (SSN-21).
   b. (U) Complete development of improved RCSR radome for AN/BRD-7 antenna.
   c. (U) Continue development of an IEM for submarine ESM systems.

3. (U) FY 1992 Plans:
   a. (U) Begin development of upgrades to the AN/WLQ-4(V)1 ESM System.
   b. (U) Continue development of an IEM for submarine systems.
   c. (U) Begin program for replacement of obsolete parts in submarine ESM systems.

PROGRAM ELEMENT: 0604515N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Submarine Surveillance Support Program
PROJECT NUMBER: S0775 PROJECT TITLE: Submarine Surveillance Support Program

4. (U) FY 1993 Plans:
   a. (U) Continue development of upgrades to the AN/WLQ-4(V)1 ESM System.
   b. (U) Continue program for improved reliability and maintainability of submarine ESM systems.
   c. (U) Continue development of an IEM for submarine ESM systems.

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: David Taylor Research Center, Bethesda, MD; Naval Underwater Systems Center, Newport, RI; Naval Sea Systems Engineering Station, Philadelphia, PA; Naval Electronic Systems T&E Detachment, St. Indigoes, MD; Naval Research Laboratory, Washington, DC.

CONTRACTOR: GTE, Government Systems, Mountain View, CA; Sanders Associates, Nashua, NH; Litton Amecon, College Park, MD; ARGO Systems, Sunnyvale, CA; Brunswick, Marion, VA; Raytheon, Santa Barbara, CA; RADANT, Stow, MA; GEC-Marconi, San Diego, CA.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
1. (U) Technology Changes: None
2. (U) Schedule Changes: None
3. (U) Cost Changes: None.

F. (U) PROGRAM DOCUMENTATION: AN/WLQ-4(V)1: OPNAVINST C9010 Ser 02/5C384451 of 13 Dec 1985. Integrated ESM Mast: CNO ltr Der 22/0C583669 of 7 February 1990.

G. (U) RELATED ACTIVITIES: PE 0603522N, Advanced Submarine Surveillance Support Program; PE 0604561N, Project S1946, SSN-21 Development.

PROGRAM ELEMENT: 0604515N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Submarine Surveillance Support Program
PROJECT NUMBER: S0775 **PROJECT TITLE:** Submarine Surveillance Support Program

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

APPN/P-1	FY1990 ACTUAL	FY1991 ESTIMATE	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE PROGRAM	TOTAL
(U) PROCUREMENT						
OPN LI# 251800	11,248	29,761	10,341	19,421	56,505	127,275
OPN LI# 251700	0	0	2,174	2,269	9,342	13,785
OPN LI# 256000	0	0	1,646	3,097	4,588	9,331

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None

J. (U) MILESTONE SCHEDULE: Not applicable

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604516N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Survivability

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY1991 ESTIMATE	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1828	Ship Survivability (Engineering)	1,740	1,682	1,375	1,440	Cont.	Cont.
S2054	DC/FF	5,065	4,554	3,673	4,056	Cont.	Cont.
TOTAL		6,805	6,236	5,048	5,496	Cont.	Cont.

B. (U) DESCRIPTION: This program supports full scale development of equipment/systems to enable continued, effective combat missions through protection from weapons effects due to hostile actions and peace time accidents. This program also supports the engineering development of improved Damage Control/Fire Protection and Firefighting equipment, devices, and systems for rapid control/suppression of damage/fire with retention of ship mission.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604516N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Survivability
PROJECT NUMBER: S1828 PROJECT TITLE: Ship Survivability (Engineering)

C. (U) DESCRIPTION: This project supports the full scale development of systems and components to provide protection from weapons effects, and to enable continued combat missions. Includes total ship smoke control/exhaust to support uninterrupted mission operations, rapid firefighter response, and personnel egress; exhaust stack IR signature suppression; noncombustible power/control cables resistant to high intensity fires; and uninterruptible power for mission critical combat systems.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

a. (U) Completed full-scale testing of the Smoke Ejection System (SES) on the ex-USS SHADWELL (simulated DDG-51 Collective Protection System zone).

b. (U) Completed development of the SES design package for incorporation into the DDG-51 (Flight II) Detailed Design Specification.

c. (U) Completed ship impact and cost analysis of the SES for submission to the DDG-51 Naval Adjudication Board (NAB).

2. (U) FY 1991 Program:

a. (U) Initiate engineering development of high current "2000oF" cables.

b. (U) Conduct an evaluation of an SES Main Space/DC Deck variant design.

c. (U) Develop DDG-51 NAB design package for Main Space/DC Deck variant design.

3. (U) FY 1992 Plans:

a. (U) Conduct SES applicability; conduct cost, feasibility and ship impact analyses for applicable CPS ship classes.

b. (U) Complete final SES documentation.

c. (U) Complete Bulkhead Tightness Testing and new specification criteria.

4. (U) FY 1993 Plans:

a. (U) Complete engineering support for the DDG-51 (Flight II) installation of the SES.

b. (U) Continue development of terminations and bulkhead sealing systems for "2000oF" cables.

c. (U) Conduct engineering development of combat systems uninterruptible power supply.

5. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: DTRC, Bethesda, MD; NRL, Washington, D.C. CONTRACTORS: John J. McMullen Associates, Inc., Arlington, VA; Hughes Associates, Inc., Wheaton, MD; ECO Systems International, Arlington, VA; Integrated System Analysts, Arlington, VA; Weyerhauser, Corp., Harahan, LA.

F. (U) RELATED ACTIVITIES: P.E. 0603514N S0384, (Ship Combat Survivability)

G. (U) OTHER APPROPRIATION FUNDS: Specification changes included in new construction ships (SCN funding).

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604516N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Survivability
PROJECT NUMBER: S2054 PROJECT TITLE: Ship Damage Control (Engineering)

C. (U) DESCRIPTION: This project supports the engineering development of improved damage control, fire protection and firefighting systems for rapid damage control and recovery for mission retention in a post hit situation.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

a. (U) Completed joint U.S. and British HULLVUL exercise regarding full scale live fire testing.

b. (U) Obtained formal OPEVAL certification for Damage Control Wirefree Communications System for frigate, destroyer and cruiser type ships.

2. (U) FY 1991 Program:

a. (U) Obtain OPEVAL for Damage Control Wirefree Communications System for large aircraft capable ship types.

b. (U) Complete procurement of P-250 Mod 2 High Lift Modules pre-production prototypes and initiate test and evaluations.

3. (U) FY 1992 Plans:

a. (U) Complete TECHEVAL of P-250 Mod 2 High Lift Modules.

b. (U) Initiate engineering development of Damage Control Ultrasonic Hull Communications System (DC HULLCOM).

c. (U) Complete design and initiate procurement of Portable Pumping and Power System Engineering Development Model.

4. (U) FY 1993 Plans:

a. (U) Initiate TECHEVAL of Portable Pumping and Power System.

b. (U) Award contract for Engineering Development Model of DC HULLCOM.

5. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, D.C.; DTRC, Bethesda, MD; NAVSSES, Philadelphia, PA; NSCSES, Norfolk, VA. CONTRACTORS: DYNALEC Corp., Sodus, NY; Hale Fire Pump Company, Conshohocken, PA; Weidlinger Associates, Arlington, VA; ELS Inc., Arlington, VA; Consultants and Designers, Inc., Arlington, VA; George G. Sharp, Inc., Arlington, VA.

F. (U) RELATED ACTIVITIES: P.E. 0603514N - Project S1565 (Surface Ship Damage Control for advanced development efforts)

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands):

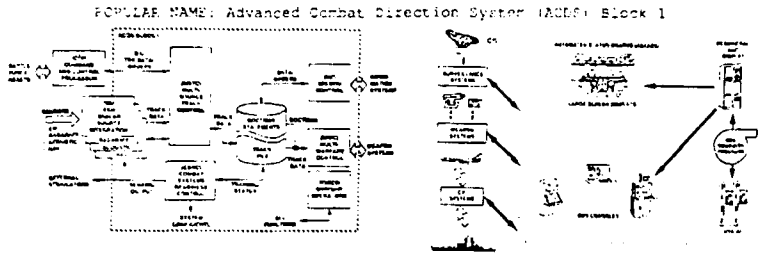
	FY 1990 ACTUAL	FY1991 ESTIMATE	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT						
COSAL Outfitting	842	4,891	22,167	25,978	Cont.	Cont.
(091000) OPN319	18,600	31,000	33,400	31,000	Cont.	Cont.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable

FY 1992/1993 RDT&E,NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604518N **BUDGET ACTIVITY** 4
PROGRAM ELEMENT TITLE: Combat Information Center (CIC) Conversion
PROJECT NUMBER: S1604 **PROJECT TITLE:** NTDS Software Improvements

POPULAR NAME: Advanced Combat Direction System (ACDS) Block 1



A. (U) SCHEDULE/BUDGET INFORMATION:

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	To Complete
Program Milestones					MS III
Engineering Milestones	CDR (CV)	TRR(SAT)	FQR (CV)	CDR (CG)	FQR (NDTV)
T&E Milestones		SAT(CV)	SAT(NDTV) CSIT (CV)	OT II CSIT (NDTV)	
Contract Milestones	CDR (CV) Award Fee		FQR (CV) Award Fee	CDR (CG) Award Fee	

BUDGET ($K)	FY 1990	FY 1991	FY 1992	FY 1993	To Complete
Major Contracts	14,300	15,039	13,458	7,751	Cont.
Support Contract	469	792	284	484	Cont.
In-House Support	2,576	5,863	2,766	2,966	Cont.
GFE/Other	2,547	3,355	2,625	3,025	Cont.
Total	19,892	25,049	19,133	14,226	Cont.

FY 1992/1993 RDT&E,NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604518N BUDGET ACTIVITY 4
PROGRAM ELEMENT TITLE: Combat Information Center (CIC) Conversion
PROJECT NUMBER: S1604 PROJECT TITLE: NTDS Software Improvements

B. (U) DESCRIPTION: (U) This program element develops software that replaces 1960's vintage Naval Tactical Data system (NTDS) operating systems and applications algorithms and implements advanced concepts for Tactical Data System upgrades for surface ships in response to future threats, operational deficiencies, and new and existing operational requirements. The program's objective is to develop integrated, coherent ship's command and control systems that will increase operational capabilities, promote standardization and introduction of new shipboard tactical displays and support equipment and provide integration between sensor/weapons systems which are organic to and outside the battle force. Included in this program are planned improvements to CV/CVN, CGN, and DDG 993 class ships, an upgrade of the Atlantic Fleet Weapons Training Facility (AFTWF) and the Pacific Missile Range Facility (PMRF) with an Advanced Combat Direction System (ACDS) Block 1 derivative. This program provides for significant Combat Direction System (CDS) improvements including implementation of the JTIDS/TADIL J message standard; implementation of the Aegis Tactical Executive System (ATES); integration and interface with New Threat Upgrade (NTU) and the Command and Control Processor (C^2P).

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

a. (U) Completed Advanced Combat Direction System (ACDS) Block 1 Computer Program detailed design.

b. (U) Conducted Critical Design Review (CDR) and performed Navy award fee review based on results.

c. (U) Completed code of the core elements of ACDS Block 1 computer program.

d. (U) Continued code of the remaining lead ship elements of ACDS Block 1 computer program.

e. (U) Continued Combat Direction System (CDS) Standard Simulation System development in support of ACDS Block 1 operational shore site testing.

f. (U) Continued integration of the Command and Control Processor (C2P) with the Advanced Combat Direction System.

g. (U) Complete design and specification of the AFWTF and PMRF derivatives.

2. (U) FY 1991 Program:

a. (U) Complete code of the remaining lead ship elements of ACDS Block 1 program.

b. (U) Complete Test Requirements Review (TRR) for system acceptance tests (SAT).

c. (U) Complete SAT on the core elements of ACDS Block 1 computer program.

PROGRAM ELEMENT: 0604518N BUDGET ACTIVITY 4
PROGRAM ELEMENT TITLE: Combat Information Center (CIC) Conversion
PROJECT NUMBER: S1604 PROJECT TITLE: NTDS Software Improvements

d. (U) Conduct Combat System Integration Test (CSIT) Readiness Review to obtain approval to begin Combat System Integration Test on the ACDS Block 1 core program.

e. (U) Begin code/test of the NDTV program.

f. (U) Complete Combat Direction System (CDS) Standard Simulation System development in support of ACDS Block 1 operational shore site testing (CSIT).

g. (U) Complete coding of the AFWTF/PMRF derivatives.

3. (U) FY 1992 Plans:

a. (U) Conduct CSIT of the ACDS Block 1 core program.

b. (U) Conduct SAT on the remaining lead ship elements.

c. (U) Conduct Formal Qualification Review (FQR)(CV).

d. (U) Complete coding/SAT of the NDTV program.

e. (U) Begin coding CGN 38/DDG 993 program.

f. (U) Deliver ACDS Block 1 (CV) operational program to lead ship.

4. (U) FY 1993 Plans:

a. (U) Conduct CSIT of the NDTV program.

b. (U) Conduct OPEVAL of the CV program.

c. (U) Complete coding of the CGN 38/DDG 993 program.

5. (U) Program to completion: This is a continuing program.

D. (U) WORK PERFORMED BY:

(U) IN HOUSE: Naval Ocean Systems Center, San Diego, CA; Fleet Combat Direction Systems Support Activity, San Diego, CA; Integrated Combat System Test Facility, San Diego, CA; and Puget Sound Naval Shipyard, Bremerton, WA. CONTRACTORS: Hughes Aircraft Co., San Diego, CA; QuesTech Inc., San Diego, CA; Unisys, St. Paul, MN.

E. (U) COMPARISON WITH FY 1991 PRESIDENTS BUDGET:

1. (U) TECHNOLOGY CHANGES: NONE

2. (U) SCHEDULE CHANGES: Delayed commencement of the CGN 38/DDG 993 program and delay CG OPEVAL until FY 96.

3. (U) COST CHANGES: None.

F. (U) PROGRAM DOCUMENTATION:

(U) DCP - 22 Aug 89

(U) TEMP #935 - Approved 15 Dec 88

G. (U) RELATED ACTIVITIES:

(U) PE 0603228N, CV ASW Module

(U) PE 0603582N, Combat System Integration

(U) PE 0205604N, JTIDS

(U) PE 0603717N, C^2P

H. (U) OTHER APPROPRIATION FUNDS: None.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

J. (U) TEST AND EVALUATION: Not applicable to this submission.

FY 1992 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604524N BUDGET ACTIVITY: 4 - Tactical Programs
PROGRAM ELEMENT TITLE: Submarine Combat Systems (Development)

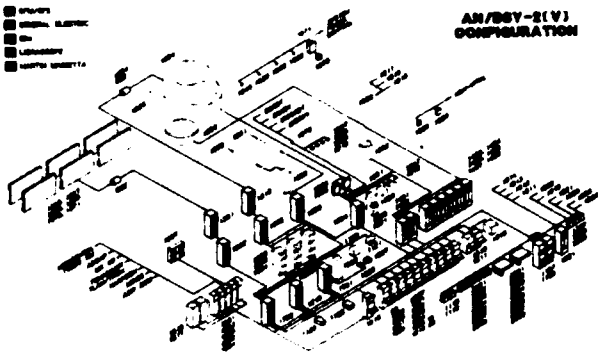
A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1347	AN/BSY-1	23,580	2,079	0	0	0	950,849
S1941	AN/BSY-2	324,200	342,207	270,272	152,149	CONT	CONT
	TOTAL	347,780	344,286	270,272	152,149	CONT	CONT

B. (U) DESCRIPTION: This program element encompasses the development of submarine combat systems for both the SSN 688 Class and SSN 21 Class submarines. The AN/BSY-1 Combat Control and Acoustic (CC/A) Subsystem will be installed in new construction submarines beginning with SSN 751. AN/BSY-1 replaces the AN/BQQ-5 Sonar and CCS MK1 Combat System. AN/BSY-1 provides capabilities for detection, classification, tracking, target action analysis, onboard training, vertical launch of weapons, under-ice operations, and increased acoustic performance over previous SSN 688 Class systems. AN/BSY-1 is planned for the FY83-FY90 SSN 688 Class submarines. The AN/BSY-2 Submarine Combat System is being developed with a distributed architecture specifically designed to meet increased processing requirements of the SSN 21 Class acoustic array suite. Major components included in the AN/BSY-2 SCS are: Wide Aperture Array, Large Spherical Array, Tactical Situation Plotter, Combat System Display Consoles, Transmit Group, Weapon Launch System (WLS), TB-12X Thin Line Towed Array, and TB-16 Towed Array.

FY 1992/93 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604524N BUDGET ACTIVITY: 4 - Tactical Programs
PROGRAM ELEMENT TITLE: Submarine Combat Systems (Development)
PROJECT NUMBER: S1941 PROJECT TITLE: AN/BSY-2
POPULAR NAME: AN/BSY-2 Submarine Combat System



A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	To Compl. Program
Milestones					
Engineering Milestones	Conducted Critical Design Review	Complete Thread 1,2 and Critical Item Testing	Deliver AN/BQG-5 Compl. Thread 3,4 Testing	Complete Thread 5, Begin Thread 6, Testing	Cont.
T&E Milestones			BQG-5 SDCT 4Q 92 TO 1Q 93	BSY-2 SDCT 1 3 & 4Q 93	
Contract Milestones	Exercised AN/BSY-2 MT LP	Exercise AN/BSY-2 LP			

BUDGET ($K)	FY 1990	FY 1991	FY 1992	FY 1993	Program Total To Complete
Major Contract	276,766	302,138	227,400	110,700	Cont.
Support Contract	8,908	8,000	7,000	6,500	Cont.
In-House Support	36,595	29,369	34,472	33,710	Cont.
GFE/Other	1,931	2,700	1,400	15490	Cont.
TOTAL	324,200	342,207	270,272	152,149	Cont.

PROGRAM ELEMENT: 0604524N BUDGET ACTIVITY: 4 - Tactical Programs
PROGRAM ELEMENT TITLE: Submarine Combat Systems (Development)
PROJECT NUMBER: S1941 PROJECT TITLE: AN/BSY-2

8. (U) DESCRIPTION: The Soviets and third world countries all have made significant advances in submarine platform quieting and combat system performance. In order to meet the demonstrated improvement by potential oppposition submarines, the Chief of Naval Operations established the SSN 21 SEAWOLF and the AN/BSY-2 Combat System Top Level Requirements. The development objectives for AN/BSY-2 are: Meet the SEAWOLF combat system related Top Level Requirements, develop an architecture which facilitates tactical improvements and future growth, and provide computer processes that improve response time from initial threat detection to weapon launch. AN/BSY-2 will provide new acoustic arrays which have improved self noise characteristics and improved detection performance. It will provide computer aids to assist the operator in sensor, contact and weapon management, and will support employment of the most advanced submarine weapons from eight torpedo tubes. The system architecture will be partitioned to facilitate tactical improvements, future growth, and high availability.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. (U) Completed Preliminary Design Review(PDR)
   b. (U) Completed Critical Design Review(CDR)
   c. (U) Exercised AN/BSY-2 Maintenance Trainer limited production option.
   d. (U) Exercised Limited Production Option for An/BSY-2 Long Lead Material.
   e. (U) Issued RFP for Team Trainer Unique Equipment.
   f. (U) Continued Critical Item Tests. (Graphics Engine, ASIC, Outboard Electronics, CSDC, WAA, WDC).
   g. (U) Continued array tests, Acoustic Vibration.
   h. (U) Conducted Production Readiness Reviews (PRR).
   i. (U) Provided Program Review Data and support DAB Program Review for LP continuation.

2. (U) FY 1991 Program:
   a. (U) Conduct Maintenance Trainer PDR.
   b. (U) Complete Critical Item Tests. WAA Shock, OBE, RDBM, System Response Time, CSDC Response Time.
   c. (U) Conduct Follower PRR.
   d. (U) Award Team Trainer Unique Equipment contract.
   e. (U) Exercise limited production options for AN/BSY-2 systems.
   f. (U) Complete WAA hardware assembly and unit test.
   g. (U) Conduct Thread 1 & 2 software demonstration.
   h. (U) Incorporate Engineering Changes as required.
   i. (U) Deliver Array for Shock Test.
   j. (U) Conduct spherical array OBE Shock Test.

PROGRAM ELEMENT: 0604524N BUDGET ACTIVITY: 4 - Tactical Programs
PROGRAM ELEMENT TITLE: Submarine Combat Systems (Development)
PROJECT NUMBER: S1941 PROJECT TITLE: AN/BSY-2

3. (U) FY 1992 Plans:
   a. Conduct Threads 3 & 4 software integration and test
   b. Award Team Trainer Tactical Contract
   c. Conduct Maintenance Trainer Critical Design Review (CDR)
   d. Award FY92 AN/BSY-2 Follow-on LP contract
   e. Start AN/BSY-2 Block Upgrade Program
   f. Design and Construct Test Bays 3,4, and 5
   g. Incorporate Engineering Changes as required
   h. Deliver WAA 8901 and 8902 Arrays
   i. Award Software Support Facility (SSF) Contract

4. (U) FY 1993 Plans:
   a. Conduct Thread 5 software integration and test
   b. Deliver the WAA 8903 hardware
   c. Deliver the BQG-5 8901 and 8902
   d. Conduct a Functional Configuration Audit AN/BSY-2
   e. Continue the AN/BSY-2 Block Upgrade Program
   f. Procure Production Tactical Team Trainer
   g. Procure Intermediate Maintenance Activity (IMA), Module Screening and Repair Activity (MSRA) and Basic Operator Trainer (BOT)

5. (U) Program to Completion:
   a. 8903 AN/BSY-2 System Delivery
   b. Deliver the Maintenance Trainer
   c. Deliver SSF
   d. Conduct a software Systems Design Certification Tests #1 and #2
   e. Deliver Thread 6
   f. Installation and Checkout of SSF
   g. Conduct TECHEVAL/OPEVAL
   h. IOC
   i. Accomplish initial delivery of AN/BSY-2 development systems
   j. Procure additional Trainers, IMAs, MSRAs as required
   k. Achieve Milestone III for Full Production
   l. Conduct factory acceptance tests on production systems
   m. Incorporate Block Upgrade changes, Milestone IV if required
   n. Procure additional Trainers, IMAs, and MSRAs as required

D. (U) WORKED PERFORMED BY: IN-HOUSE: Naval Sea Systems Command, Washington, DC (Program Management, development and procurement); Naval Underwater Systems Center, Newport, RI and New London, CT; Naval Weapons Support Center, Crane, IN; David Taylor, Naval Research and Development Center, Bethesda, MD; Navy Training Systems Center, Orlando, FL; Naval Sea Combat System Engineering Station, Norfolk, VA. CONTRACTORS: General Electric Company, Syracuse, NY, Moorestown, NJ, and Pittsfield, MA; International Business Machines, Manassas, VA; Librascope, Glendale, CA; Martin Marietta, Baltimore, MD; Computer Sciences Corporation, Moorestown, NJ; AT&T, EG&G Washington Analytical Services Center, Rockville, MD; MITRE.

PROGRAM ELEMENT: 0604524N BUDGET ACTIVITY: 4 - Tactical Programs
PROGRAM ELEMENT TITLE: Submarine Combat Systems (Development)
PROJECT NUMBER: S1941 PROJECT TITLE: AN/BSY-2

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
1. (U) Technical Changes: None.
2. (U) Schedule Changes: None.
3. (U) Cost Changes: None.

F. (U) PROGRAM DOCUMENTATION:

OR	3/86
DCP	9/87
TEMP	8/90

G. (U) RELATED ACTIVITIES: Acoustic system concepts completing advanced development in PE 0603504N will, as applicable, be transitioned to full scale engineering development in this program. Development of the Combat Control System MK I and related software program is continuing in Submarine Tactical Warfare System (Engineering) (PE 0604562N, Project S0236). The Submarine Combat system also interfaces with: MK 48 Advanced Capability Torpedo (PE 0604675N); TOMAHAWK (PE 0604367N); Submarine Launched Mobile Mine (PE 0604601N); Submarine Sonar Development (Engineering) (PE 0604503N); Enhanced Modular Signal Processor (PE 0604507N): Submarine Surveillance Equipment (PE 0604515N); Over-the-Horizon Targeting (PE 0603530N Project X0798); Submarine Tactical Warfare Systems (Engineering) (All Projects) (PE 0604562N); and Submarine Communications (PE 0604502N).

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TOTAL PROGRAM TO COMPLETE
(U) PROCUREMENT					
APPN/P-1					
SCN SSN-21	0	217,914	452,517	265,800	Cont.
Quantities	0	1	2	1	Cont.
BA 2 (OPN) #69	148.6	0	151.0	110.3	Cont.
					Cont.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

J. (U) TEST AND EVALUATION: Not applicable.

FY 1992/93 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604559N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: DEEP SUBMERGENCE TECHNOLOGY
PROJECT NUMBER: S2094 PROJECT TITLE: UNMANNED UNDERWATER VEHICLE

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S2033*	ADV SUB SYS ENG	5475	12900	0	0	0	18375
S2094	UNMANNED UNDERWATER VEHICLE	0	0	27284	21991	CONT.	CONT.

*FUNDED IN PE 063561N

B. (U) DESCRIPTION: This project is a result of a Memorandum of Agreement (MOA) signed in 29 July 1988 between Navy (ASN RE&S) and DARPA for the conduct of a Joint Unmanned Undersea Vehicle (UUV) Prototype Program. The project calls for DARPA to develop two prototype (non-mission specific) UUVs, to develop and integrate three mission-capable modules, integrated with the UUVs to demonstrate the utility of UUVs in meeting designated mission requirements. The three mission modules are: the Tactical Acoustic System (TAS); the Mine Search System (MSS), to provide a semi-autonomous mine avoidance capability to guide a submarine through a mine field; and the Remote Surveillance System (RSS), for the autonomous deployment of a distributed sensor array in an Anti-Submarine Warfare (ASW) role.

(U) DARPA's responsibilities are to develop and demonstrate the prototype systems using a rapid prototyping approach and then transition them to the Navy. The Navy's responsibilties in the joint program are to provide DARPA with 25% of the required prototype funding and to establish Navy programs to transition the three prototype systems to a Milestone II decision for full-scale development and long range industrial procurement. Both the DARPA prototype and Navy full-scale development systems are to be developed in a generally sequential order (i.e., TAS first, followed by MSS, and then RSS).

(U) FY 1990 and FY 1991 Navy funding for the joint UUV program came from PE 63561N S2033, which also addresses other Advanced Submarine Technology efforts. FY 1992 and outyear UUV funding had been previously programmed into S2033. S2094 was established in POM - 92 to provide the UUV effort its own distinct accountability and management commencing in FY 1992. The FY 1992 and outyear UUV funding was reallocated from S2033 to S2094.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:
1. (U) FY 1990 ACCOMPLISHMENTS:
a. (U) First UUV completed Preliminary Performance Tests (PPT) in August 1990. TAS was integrated to the UUV in September 1990. Integrated TAS testing started in October 1990. Second UUV to be delivered in March 1991. MSS contract awarded in January 1990. MSS Preliminary and Interim Design Reviews held.

PROGRAM ELEMENT: 0604559N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: DEEP SUBMERGENCE TECHNOLOGY
PROJECT NUMBER: S2094 PROJECT TITLE: UNMANNED U/W VEHICLE

2. (U) FY 1991 PROGRAM:

a. (U) DARPA to complete TAS prototype testing in December 1990. Navy to conduct additional testing by June 1991 to determine extent of additional advanced development required prior to MSII. Commence development of specifications for Navy advanced development or full-scale development TAS system or subsystems. TAS OR submitted and being promulgated. MSS design to be completed and manufacturing commence. Development Options Paper (DOP) to be done for MSS.

3. (U) FY 1992 PLANS:

a. (U) TAS advanced development or full-scale development contract to be awarded. OR for MSS to be submitted and promulgated. RSS DOP to be developed. DARPA MSS testing to commence. Limited advanced development conducted for MSS and RSS.

4. (U) FY 1993 PLANS:

a. (U) Continue TAS advanced development or full-scale development. Complete MSS prototype testing and transition to Navy. Submit and promulgate RSS OR.

5. (U) PROGRAM TO COMPLETION: This is a continuing program

D. (U) WORK PERFORMED BY:

In-House: NAVSEASYSCOM (SEA 06UR), Washington, DC; NAVCOASTSYSCEN, Panama City FL; NUSC, Newport RI; NAVOCEANSYSCEN, San Diego CA; NAVUSEAWARENGSTA, Keyport WA.

Contractors: Martin Marietta , Baltimore MD; Lockheed Missile & Space Co., Sunnyvale CA; Raytheon, Portsmouth RI; AT&T, Whippany NJ; C.S. Draper Laboratory, Cambridge MA; Applied Physics Laboratory/JHU, Laurel MD.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET
Technical Changes: none
Schedule Changes: none
Cost Changes: none

F. (U) PROGRAM DOCUMENTATION:

1. (U) Memorandum of Agreement, Unmanned Undersea Vehicle Prototype Program, signed 29 July 1988.

PROGRAM ELEMENT: 0604559N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: DEEP SUBMERGENCE TECHNOLOGY
PROJECT NUMBER: S2094 PROJECT TITLE: UNMANNED U/W VEHICLE

2. (U) TOR for Submarine Mine Countermeasures, dated 21 May 1986. This TOR has been updated and will be promulgated as the MSS TOR.

3. (U) TOR for ASW UUV, dated 20 April 1989. This TOR is to be modified to become the RSS TOR.

G. (U) RELATED ACTIVITIES:

None.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

None.

I. (U) International Cooperative Agreement:

None.

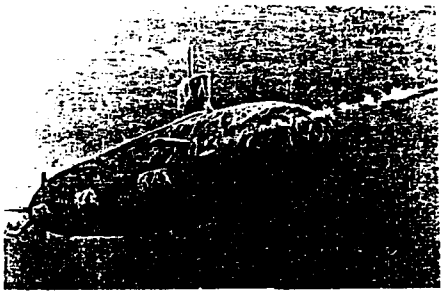
J. (U) MILESTONE SCHEDULE:

TAS:	Transition from DARPA:	Jan 1991
	MS II:	Mar 1992 *
	MS III:	Sep 1995 *
MSS:	Transition from DARPA:	Sep 1993
	MS II:	Jun 1994
	MSS III:	Sep 1998
RSS:	Transition from DARPA:	Sep 1996
	MS II:	Sep 1997
	MSS III:	Sep 2001

* (U) Current estimates to be revised upon completion of Navy tests to be conducted 3rd Qtr FY91. Milestones could be delayed by two years.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604561N BUDGET ACTIVITY: 4-Tactical Programs
PROGRAM ELEMENT TITLE: SSN 21 Development
PROJECT NUMBER: S1946 PROJECT TITLE: SSN 21 Development



A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	TO COMPLETE
PROGRAM MILESTONES		OSD PROGRAM REVIEW			CONTINUING PROGRAM
ENGINEERING MILESTONES	FOLLOW-ON SHIPS	FOLLOW-ON SHIPS	FOLLOW-ON SHIPS	FOLLOW-ON SHIPS	CONTINUING PROGRAM
T&E MILESTONES	DT-II OT-II	DT-II OT-II	DT-II OT-II	DT-II OT-II	CONTINUING PROGRAM
CONTRACT MILESTONES		FOLLOW-ON CONTRACT	FOLLOW-ON CONTRACTS	FOLLOW-ON CONTRACT	CONTINUING PROGRAM

BUDGET ($K)	FY 1990	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL TO COMPLETE
MAJOR CONTRACT	68,979	70,387	78,902	65,080	CONT
SUPPORT CONTRACT	5,646	5,065	3,064	3,135	CONT
IN-HOUSE SUPPORT	96,075	104,551	65,943	55,636	CONT
GFE/ OTHER	9,411	8,951	9,532	9,350	CONT
TOTAL	180,111	188,954	157,441	133,201	CONT

PROGRAM ELEMENT: 0604561N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: SSN 21 DEVELOPMENT
PROJECT NUMBER: S1946 PROJECT TITLE: SSN 21 DEVELOPMENT

B. (U) DESCRIPTION: The SSN 21 Class Attack Submarine will be quiet, fast, heavily armed, shock resistent, survivable, outfitted with an advanced combat system and capable of contending with the projected enemy threat well into the 21st century. The program element provides the advanced technology, prototype components and systems to design and construct the SSN 21 Class Attack Submarine using cost effective modular construction techniques, and directly support the SSN 21's multi mission capability. This program element includes cost reduction efforts, producibility initiatives and technical risk reduction initiatives. Cost reduction efforts include improving the special hull treatment application process, and weight reduction. In addition significant technical advances in areas such as silencing, survivability, deep depth, speed and combat system integration are also included. Affordability is also a key consideration. The SSN 21 is expected to satisfy its multi mission requirement.

C. ( ) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. ( ) FY 1990 ACCOMPLISHMENTS:

a. ( ) Performed long term at-sea evaluations of ( ) prototype equipment and features. Continued acoustical evaluation of design effort.

b. (U) Validated design of submerged operating envelope.

c. (U) Expanded validated design guidance for water/self-lubricated external bearings.

d. ( ) Conducted assessment of Fabricated and evaluated inherently

e. (U) Commenced testing for Thrust Bearing Land Based Test Site.

f. (U) Completed prototype R-114 Air Conditioning Unit fabrication and commenced qualification testing.

g. ( ) Completed land-based and shipboard evaluation of Oxygen Generator.

h. (U) Fabricated Advanced Submarine Battery (ASB) and began qualification tests.

i. (U) Completed land based evaluation of high pressure air dehydrator.

j. (U) Commenced qualification tests for trim and drain pump.

k. (U) Conducted full scale qualification tests for stern tube bearings.

l. (U) Completed shipyard manufacturing procedures for INCONEL pipe.

m. (U) Continued manufacture of SSN 21 SSTG.

n. (U) Commenced land based testing on Improved Performance Machinery Program (IPMP II).

o. (U) Completed qualification test and A/B-1 shock test of shaft seal.

p. (U) Conducted shock qualification of those components identified as a result of the SSN 699 shock testing to be most susceptible to failure under shock.

q. ( ) Continued evaluation of Continued Large Scale Vehicle (LSV) propulsor testing. Completed model shock tests.

r. ( ) Provided for SSN 21. Commenced Continued testing of critical design features.

s. ( ) Performed testing of torpedo tube prototype upgrade. Continued

PROGRAM ELEMENT: 0604561N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: SSN 21 Development
PROJECT NUMBER: S1946 PROJECT TITLE: SSN 21 Development

ejection system testing. Completed Internal Auxiliary Launcher (IAL) and test facility.

t. (U) Conducted large scale fire testing of SSN 21 configurations/materials. Validating fire performance of HM&E systems.

u. (U) Procured prototype Impressed Current Cathodic Protection (ICCP) system.

2. ( ) FY 1991 Program:

a. (U) Continue to conduct foundation acoustic design evaluation/validation.

b. (U) Commence Ship Control System (SCS) prototype fabrication.

c. (U) Complete land based testing of thrust bearing/vibration reducer.

d. (U) Complete qualification testing of R-114 prototype.

e. (U) Complete fabrication of SSN 21 prototype battery and continue ASB-III qualification testing. Evaluate prototype Automatic Battery Monitor System (ABMS).

f. (U) Commence at-sea evaluation of high pressure air dehydrator.

g. (U) Complete vendor qualification tests for trim and drain pump.

h. (U) Conduct full scale at-sea evaluation of stern tube bearings.

i. (U) Complete manufacture of SSTG II shock test unit.

j. (U) Continue land based testing on Improved Performance Machinery Program (IPMP II).

k. (U) Continue seawater system development.

l. (U) Conduct land based evaluation of fire resistent hydraulic fluid.

m. (U) Continue shock qualification tests of SSN 21 components.

n. (U) Manufacture LSV propulsors and continue testing with LSV.

o. ( ) Perform tests to update maneuvering estimates for the final

p. ( ) Continue development of Conduct quiet bearings qualifications.

q. ( ) Finalize Conduct material at-sea tests and analyze results.

r. ( ) Conduct and analyze material at-sea tests.

s. (U) Commence Mold In Place (MIP) installation technology development for the sail material.

t. (U) Complete SHT material certification tests.

3. ( ) FY1992 Plans:

a. (U) Complete SCS prototype fabrication and commence hardware and software integration testing.

b. (U) Complete qualification tests of ABMS commence fabrication of SSN 21 qualification cells.

c. (U) Complete seawater system development.

d. (U) Conduct at sea test of non-flammable hydraulic fluid.

e. (U) Conduct shock testing of IPMP II Main Propulsion Unit (MPU) on A/B-1.

f. (U) Continue shock qualification tests of SSN 21 items.

g. (U) Continue propulsor fabrication and testing with LSV.

PROGRAM ELEMENT: 0604561N BUDGET ACTIVITY: 4-Tactical Programs
PROGRAM ELEMENT TITLE: SSN 21 Development
PROJECT NUMBER: S1946 PROJECT TITLE: SSN 21 Development

h. (U) Install and commence at-sea evaluation of full scale prototype SHT.

4. FY 1993 Plans:
   a. (U) Continue at sea evaluation of non-flammable hydraulic fluid.
   b. (U) Conduct shock qualification of SSN 21 components using SSTV.
   c. (U) Complete prototype fabrication/delivery of full scale propulsor.
   d. (U) Continue at-sea evaluation of full scale [SHT] prototype.
   e. (Complete prototype testing, including

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: In-House: DTRC Bethesda, MD; NUSC, Newport, RI; NRL, Washington, DC; NAVSSES, Philadelphia, PA; NCSC, Panama City, FL; NOSC, San Diego, CA; SUPSHIP San Francisco, CA; NSWC, Dahlgren, VA; MINSY, Vallejo, CA; PSNSY, Bremerton, WA; PNSY, Portsmouth, NH; ONR, Arlington, VA; LBNSY, Long Beach, CA; TRF, Bangor, WA; NRL, Orlando, FL; DOE, Oak Ridge, TN; NAVSUP Code 015, Washington D.C. Contractors: GD, Electric Boat Division, Groton, CT; NNS, Newport News, VA; ASC, Virginia; Westinghouse Electric Corporation, Pittsburgh, PA; GE, Lynn, MA., Fitchburg, MA; Binghamton, NY; and Schenectady, NY;

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
   1. (U) Technical changes: None
   2. (U) Schedule changes: None
   3. (U) Cost changes: None.

F. (U) PROGRAM DOCUMENTATION:
   TLR 12/85 DCP 5/88 TEMP REV 2 8/90
   CH-1 5/89

G. (U) RELATED ACTIVITIES: 0603569N (Advanced Submarine Technology), 0603570N (Advanced Nuclear Reactor Systems and Components), 0604567N (Ship Sub Sys Dev), 0604524N (Submarine Combat Systems), 0604502N (Submarine Communications).

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY1990 ACTUAL	FY1991 ACTUAL	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
SCN #2(SSN-21)	586,300	1,783,400	1,858,994	2,128,206	CONT	CONT
OPN: *	4,817	21,111	41,936	25,529	CONT	CONT
MILCON:	0	27,349	0	0		

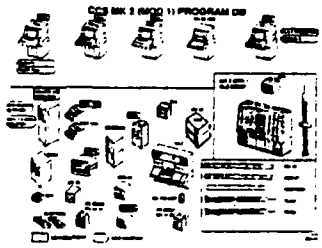
* various line item numbers

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NATO Comparative Test Program (ICCP System).

J. TEST AND EVALUATION: This information contained the 1991 Congressional Data Sheets.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604562N BUDGET ACTIVITY: 4 - Tactical Programs
PROGRAM ELEMENT TITLE: Submarine Tactical Warfare System (Engineering)
PROJECT NUMBER: S0236 PROJECT TITLE: Attack Submarine Combat Control System Improvement Program (CCSIP)



POPULAR NAME: CCSIP

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	TO COMPLETE
Program Milestones					
Program C4.2		3/91, RTF			
Program C4.2 Rev 1 TBD					
MK 2 (D0 Software)				8/93; MSIII	
MK 2 FOLLOW-ON (D1 Software)			9/92; MSII		
MK 2 FOLLOW-ON (D2 Software)					4Q/94; MSII
MK 2 FOLLOW-ON (D3 Software)					4Q/96; MSII
Engineering Milestones					
C4.2	6/90, CERT				
C4.2 Rev 1		9/91, CDR			
MK 2	7/90,PDR (MK 2 Mod 0/1)	12/90,CDR (MK 2 Mod 0/1)	4/92, CERT (MK 2 Mod 0/1) 11/91, PDR 5/92,CDR (MK 2 MOD 2)		1Q/94, CERT (MK 2 MOD 2)
T&E Milestones					
C4.2	12/89,FAT	10/90,OPEVAL			
C4.2 Rev 1				1/93, CERT	
MK 2				2/93, D0 TECHEVAL 5/93, D0 OPEVAL	
MK 2 FOLLOW-ON (D1 SOFTWARE)					2Q/95; D1 TECHEVAL 3Q/95; D1 OPEVAL
MK 2 FOLLOW-ON (D2 SOFTWARE)					2Q/97, D2 TECHEVAL 3Q/97; D2 OPEVAL

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604562N BUDGET ACTIVITY: 4 - Tactical Programs
PROGRAM ELEMENT TITLE: Submarine Tactical Warfare System (Engineering)
PROJECT NUMBER: S0236 PROJECT TITLE: Attack Submarine Combat Control System Improvement Program (CCSIP)

Contract Milestones
MK 2 FOLLOW-ON (D1 Software; OER Kits) 12/92 Award
MK 2 FOLLOW-ON (D2 Software; OER Kits) 1Q/94, Award
MK 2 FOLLOW-ON (D3 Software; OER Kits) 1Q/96, Award

BUDGET (SK)	FY1990	FY1991	FY1992	FY1993	PROGRAM TOTAL TO COMPLETE
Major Contract	53700	55700	48800	39300	CONTINUING
Support Contract	1200	3242	3750	3708	CONTINUING
In-House Support	5910	15490	25994	20675	CONTINUING
GFE/ Other	227	190	664	180	CONTINUING
TOTAL:	61037	74622	79208	63863	CONTINUING

B. (U) DESCRIPTION: Soviet attack submarines are expected to incorporate improvements through the 1990's which will make their detection and destruction more difficult. This program counters the evolving threat by supporting engineering development to integrate improved weapons capabilities within the submarine Combat Control System (CCS) MK 1, MK 2, AN/BSY-1 (Combat Control (CC)), and Mk 117 Fire Control System. In FY89 and beyond the primary thrust of the CCSIP program is the development and introduction of the CCS Mk 2 Combat Control System. CCS Mk 2 is an evolutionary program that, in conjunction with the AN/BQQ-5E Sonar Suite, will provide for a functionally equivalent combat system onboard SSN 688 Class, SSN 751 Flight (AN/BSY-1 Platforms), and SSBN 726 Class (TRIDENT) submarines. The CCS Mk 2 program makes maximum use of Navy Standards and non-developmental items and replaces obsolete equipment which is no longer in production or has become increasingly difficult to maintain. Follow-on Mk 2 efforts (Program D1, D2, D3) provide enhanced weapons deployment capabilities and rapid software update procedures.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604562N BUDGET ACTIVITY: 4 - Tactical Programs
PROGRAM ELEMENT TITLE: Submarine Tactical Warfare System (Engineering)
PROJECT NUMBER: S0236 PROJECT TITLE: Attack Submarine Combat Control System Improvement Program (CCSIP)

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. (U) Completed FAT/CERT/SDCT for Program C4.2.
   b. (U) Supported TECHEVAL and OPEVAL of Program C4.2.
   c. (U) Monitor performance of CCS MK 2 Program D0 prime contractor.
   d. (U) Initiated competition planning for follow-on CCS Mk 2 Development Contract (D1/D2).
   e. (U) Completed Software Specification Review (SSR) for MK 2 Mods 0/1, 2 and 3 and establish the S/W allocated baseline.
   f. (U) Completed Preliminary Design Review (PDR) for MK 2 Mod 0/1.
2. (U) FY 1991 Program:
   a. (U) Initiate development of Program D1/D2 specifications and related documentation to support competitive procurement.
   b. (U) Conduct Critical Design Review (CDR) for CCS Mk 2 Mods 0/1 Program D0 Software.
   c. (U) Release Program C4.2 to the Fleet.
   d. (U) Awarded Program C4.2 Rev 1 contract to incorporate TOMAHAWK Block III.
   e. (U) Complete Critical Design Review (CDR) for C4.2 Rev 1.
3. (U) FY 1992 Plans:
   a. (U) Certify CCS Mk 2 Mod 0/1 Variants (SSN 688, VLS & Non-VLS).
   b. (U) Complete Design Definition, ARB, & NPDM for initial Mk 2 Follow-On Effort (Program D1).
   c. (U) Conduct CDR for CCS Mk 2 Mod 2 Program D software.
   d. (U) Complete SDCT and Government Cert. for CCS Mk 2 Mod 0/1.
   e. (U) Complete PDR for CCS Mk 2 Mod 2.
4. (U) FY 1993 Plans:
   a. (U) Complete OPEVAL/TECHEVAL for CCS Mk 2 (Mods 0/1).
   b. (U) Award initial Mk 2 Follow-On Contract (Program D1).
   c. (U) Complete SDCT for Mk 2 Mod 2.
   d. (U) Complete CERT for C4.2 Rev 1.
5. (U) Program To Completion:
   This is a continuing program.

D. (U) WORK PERFORMED BY: In-house: PEO-SCWS (PMO409), Washington, DC; COMOPTEVFOR Norfolk, VA; NUSC, Newport, RI; Naval Underwater Weapons Engineering Station, Keyport, WA; Naval Ship System Combat Engineering Station, Norfolk, VA; NOSC, San Diego, CA; Naval Weapon Support Center, Crane, IN. Contractors: UNISYS, St. Paul, MN; Raytheon, Portsmouth, RI; Lockheed, Austin, TX; LORAL Corporation, Akron, OH; EG&G Washington Analytical Services, Inc., Rockville, MD.

PROGRAM ELEMENT: 0604562N BUDGET ACTIVITY: 4 - Tactical Programs
PROGRAM ELEMENT TITLE: Submarine Tactical Warfare System (Engineering)
PROJECT NUMBER: S0236 PROJECT TITLE: Attack Submarine Combat Control System Improvement Program (CCSIP)

E. (U) COMPARISON WITH REVISED FY 1991 PRESIDENT'S BUDGET:

1. (U) Technical changes: Program C4.2 Rev 1 modified the existing C4.2 contract to incorporate TOMAHAWK Block III into the Submarine Combat Control System Mk 1 as a follow-on enhancement.
2. (U) Schedule changes: CCS Mk 2 MSIII and TECHEVAL/OPEVAL milestones slipped as a result of test ship availability.
3. (U) Cost changes: RDT&E net increase of $0.7M in FY91 was applied to Program C4.2 Rev 1 and Mk 2 engineering change development. Additionally, in FY91, $4.9M was reprogrammed internally from in-house support to major contract.

F. (U) PROGRAM DOCUMENTATION:

NDCP (S0236-05)	9-88 (CCS Mk 2)
NDCP (S0236-AS)	12-87 (Programs C4 and C5)
NDCP (S0236-04)	8-89 (Program C4.1 MS III)
AP-111-87	9-87 (CCS Mk 2)
TEMP 234-9	9-88 (CCS Mk 2)
TEMP 234-8	7-90 (Program C4.2)

G. (U) RELATED ACTIVITIES:

1. (U) WEAPONS: Program Element 0604367N, TOMAHAWK Cruise Missile; Program Element 0604675N, MK 48 Advanced Capability Torpedo; Program Element 0604601N, Submarine Launched Mobile Mine; and Program Element 0604370N, SSN 688 Class Vertical Launch System.

2. (U) SENSORS: Program Element 0604707N, Over the Horizon Targeting; Program Element 0603708N, Acoustic Performance Prediction; Program Element 0604503N, Submarine Sonar Improvement; Program Element 0604502N, Submarine Tactical Communications System; Program Element 0603504N, Submarine Sonar Development.

3. (U) OTHER: Program Element 0604524N, AN/BSY-1; to minimize duplicative work and maximize operational and logistic commonality, CCS MK 1 hardware and software components are used in the Combat Control Subsystem of AN/BSY-1.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

PROCUREMENT APPN BA-4	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
OPN #230	47254	53775	42615	59252	CONTINUING	CONTINUING
All Digital Attack Center (ADAC) (Includes Installation Funds)					PROGRAM	PROGRAM

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None

J. (U) TEST AND EVALUATION DATA: OPEVAL/TECHEVAL for CCS Mk 1 Program C4.2 was conducted during August/September, 1990. The results of this evaluation are scheduled to be released by COMOPTEVFOR December 1990. Corrections to identified deficiencies are planned to be incorporated prior to the initial installation date of April 1991. No OPEVAL/TECHEVAL activities are scheduled for CCS Mk 1 Program C4.2 Rev 1 or CCS Mk 2 during FY91.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604567N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Subsystem Development/LBTS

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPL.	TOTAL PROGRAM
S0857	Ship Subsystem Development/LBTS	4,640	0	0	0	0	238,281
S1803	Ship Contract Design	35,221	31,290	32,827	35,500	CONT.	CONT.
S2037	NFR-90	288	1,030	0	0	0	1,318*
	TOTAL	40,149	32,320	32,827	35,500		

B. (U) DESCRIPTION: Conduct necessary engineering development of contractual packages for acquisition of ships in the Navy's Shipbuilding Program. Support Land Based Test Sites for ship systems to be incorporated in the design and construction of these ships. Support project definition (NATO equivalent of contract design) for NATO Frigate Replacement for the 1990's (NFR-90).

*Program cancelled.

FY 1992\93 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604567N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Subsystem Development/LBTS
PROJECT NUMBER: S1803 PROJECT TITLE: Ship Contract Design

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1803	Ship Contract Design	35,221	31,290	32,827	35,500	CONT.	CONT.

B. (U) DESCRIPTION: This program performs the engineering development of contractual documentation for the acquisition of ships in the Navy's Shipbuilding Program. All ship acquisitions require pre-award design planning. The end product of the Contract Design Phase is the technical and contractual definition of the ship design (e.g., ship specifications and drawings), with sufficient details for the prospective shipbuilder to make a sound estimate of construction cost and schedule. This program also provides design tools which support development of contract design and production transition.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:
   a. (U) Completed CV-64(SLEP), TAGS-45(MIZAR), TAGS- 60(MONO), MHC contract design.
   b. (U) Continued DDG-51 FLT II, CV-67(SLEP), AGOR- 24, CRAFT, LHD-5, TAGOS-23(SW-A) contract design and Specification Improvement Program.
   c. (U) Began AGOS, AOE-10, TAGSO(ICE), AOE(V), MHC(V), ARS(V), TAGSO(SW) contract design and Designing for Production Program.

2. (U) FY 1991 PROGRAM:
   a. (U) Complete LHD-5 contract design.
   b. (U) Continue DDG-51 FLT II, AGOR-24, CRAFT, MHC(V), TAGOS-23(SW-A), TAGSO(ICE) contract design, Specification Improvement Program and Designing for Production Program.
   c. (U) Begin contract design for TAGSO (SW), CVN-76, Ship Fiber Optics Topology and EMENG design tools.

PROGRAM ELEMENT: 0604567N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Subsystem Development/LBTS
PROJECT NUMBER: S1803 PROJECT TITLE: Ship Contract Design

3. (U) FY 1992 PLANS:
   a. (U) Complete AGOR-24, TAGSO(ICE), DDG-51 FLT II contract design, Fiber Optics Topology Program.
   b. (U) Continue CRAFT, MHC(V), TAGOS-23(SW-A), CVN-76,TAGSO (SW) contract design, Specification Improvement Program and Designing for Producibility Program.
   c. (U) Begin L(X), ARS(V) contract design.

4. (U) FY 1993 PLANS:
   a. (U) Complete TAGSO(SW) contract design.
   b. (U) Continue CRAFT, L(X), MHC(V), CVN-76, TAGOS-23 (SW-A), ARS(V) contract design, Specification Improvement Program and Designing for Production Program.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: Naval Ship Systems Engineering Station, Phila.,Pa., David Taylor Research Center, Bethesda, Md. CONTRACTORS: Gibbs & Cox, New York, NY, Bath Iron Works, Bath, Me., JJMA, Inc., Arlington, Va., Advanced Marine Engineering, Arlington, Va..

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not Applicable.

2. (U) SCHEDULE CHANGES: Overall adjustments are based on changes to the Navy's Shipbuilding Program.

3. (U) COST CHANGES: Not Applicable.

F. (U) PROGRAM DOCUMENTATION: Not Applicable.

G. (U) RELATED ACTIVITIES: Program Element 0603564N, Ship Development (Adv.).

H. (U) OTHER APPROPRIATED FUNDS: Not Applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE:

SHIP	FISCAL YEAR OF AWARD
MHC, TAGS-45(MIZAR), TAGS-60(MONO)	FY 1990
LHD-5	FY 1991
AGOR-24, TAGSO(ICE), DDG-51 FLT II	FY 1992
TAGOS-23(SW-A), TAGSO(SW)	FY 1993
ARS(V)	FY 1994
L(X), CVN-76, MHC(V)	FY 1995

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604574N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Standard Embedded Computer Resources

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1353	Standard Hardware Systems	12,411	9,712	8,419	7,620	Cont.	Cont.
X0911	Computer Security	1,375	2,097	3,099	3,018	Cont.	Cont.
X1976	Next Generation Computer Resources	13,043	11,892	19,332	23,392	Cont.	Cont.
W0845	AYK-14	2,934	5,650	5,717	2,180	Cont.	Cont.
	TOTAL	29,763	29,351	36,567	36,210	Cont.	Cont.

B. (U) DESCRIPTION: Standard Embedded Computer Resources include computers, display systems, peripherals, and associated software. These equipments are not stand-alone units. Rather, they are integral building blocks of larger weapons, sensor, and C3I systems. By requiring Navy systems to use standard computer resources, we avoid many interoperability, logistics support, documentation and training problems throughout the life of the systems in the Fleet. This program provides the technical planning and engineering support for development and evolution of the Navy's high performance embedded computer resources. The program includes product improvement of current in-fleet computers AN/AYK-14, AN/UYK-43 and AN/UYK-44; development of the Advanced Video Processor (AVP) for ASW applications; development of state-of-the-art mass memory storage devices (MMSD); computer security products; and development of the interconnects, interfaces, protocols, and standards (hardware and software) needed for the highly flexible architectures of the Navy's next generation computer resource family.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0604574N Budget Activity: 4
Program Element Title: Standard Embedded Computer Resources
Project Number: S1353 Project Title: Standard Hardware Systems

C. (U) DESCRIPTION: Planning and support for development and evolution of the Navy's high performance embedded computer resources.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Continued UYK-43/44 Production Improvements; delivered UYK-43 Embedded Mass Memory (EMM) and Time Critical Subfunction (TCS) coprocessor delivered to users and evaluated Open Architecture backpanel; simulation of UYK-43 High Performance Processor (HPP) and High Bandwidth Memory (HBM); delivered UYK-44 Enhanced Processor (EP) for software integration and received breadboards of EEPROM microcode for evaluation; developed MMSD Emulation Validation Software for performance testing; developed documentation for MMSD logistics certification and MS III approval; held MMSD CDR; continued AVP FSED and begin Operational Suitability Testing (OST) in SQQ-89 ASW System; initiated tasks with Navy Labs to determine display workstation requirements; initiated task with contractor to assess industry trends on display workstations.

2. (U) FY 1991 Program: Complete UYK-43 HPP design and layout; productize UKY-43 TCS and EMM and begin production deliveries; production delivery of UYK-44 EP on VME and SEM; witness MMSD contractor and conduct independent Government qualification testing; continue efforts towards MS III review and approval; continue AVP FSED and OST; complete draft display requirements document by 2/91; balance of display program on hold due to lack of funds.

3. (U) FY 1992 Plans: Productize UYK-43 HPP and HBM; continue evaluation of UKY-43/44 open architecture; begin development of faster UYK-44 processor and repackage subsystems to single boards; obtain MMSD MS III approval; investigate and develop specs and SOW for next generation peripheral; complete AVP FSED and begin transition to production; issue RFP for display workstation; evaluate proposals and award contracts for FSED color workstation.

4. (U) FY 1993 Plans: Place UYK-43 HPP and HBM into production and investigate higher performance processor and I/O capability; produce UYK-44 with faster processors (EPx6); productize UYK-43/44 open architecture; develop next generation peripheral RFP; issue RFP and hold bidders' conference; complete color workstation design; evaluate color workstation design.

5. (U) Program to completion: This is a continuing program.

E. (U) WORK PERFORMED BY: In-House: NWSC; NOSC; NUSC; NSWC; FCDSSA, DN; FCDSSA, SD; NSCSES; NAC; NESEA; NADC; Contractors: UNISYS, St, Paul, MN; CDC, Minneapolis, MN; DRS, Oakland, NJ; JHU/APL, Laurel, MD; Microlithics, Golden, CO; ISA, Arlington, VA; ELS, Washington, DC

F. (U) RELATED ACTIVITIES: All Navy non-avionics programs using SECR, including AEGIS, NTDS, BSY-2, TRIDENT, ACDS, AN/SQQ-89, Marine Corps, FMS and other service projects

G. (U) OTHER APPROPRIATION FUNDS: NONE
I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604574N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Standard Embedded Computer Resources (SECR)
PROJECT NUMBER: X0911 PROJECT TITLE: Computer Security

C. (U) DESCRIPTION: Project develops necessary capabilities to establish secure computer environments in Navy programs. DODD 5200.28 mandates that all DOD computer systems processing classified sensitive data will meet class C2 (Controlled Access Protection) by 1992. Project develops products cooperatively with industry (e.g., methods/models, performance measurement techniques and guidelines for database management, network, backplane and operating system implementations) satisfying Navy computer security requirements such as: sanitization and transfer of intelligence information for command and control (SI and GENSER), system monitoring and detection of unauthorized use or intrusion into computer systems, and Multi-Level Security (MLS) for access control for computers and decision aid systems.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:
   a. (U) Began developing trusted products for integrated Mission Critical Computer Resources (MCCR).
   b. (U) Began evaluating MLS issues in Open Systems Architecture (OSA).
   c. (U) Began Certification and INFOSEC Engineering Laboratory (CIEL) effort.
2. (U) FY 1991 PLANS:
   a. (U) Continue developing trusted products for integrated MCCR.
   b. (U) Continue evaluating MLS in OSA.
   c. (U) Continue CIEL development.
   d. (U) Initiate development of integration methodology.
3. (U) FY 1992 PLANS:
   a. (U) Continue developing trusted products for integrated MCCR.
   b. (U) Continue evaluating MLS in OSA.
   c. (U) Continue CIEL development.
   d. (U) Begin Secure Systems Implementation requirements definition.
   e. (U) Publish Interim Backplane/OS/LAN security standard(s).
   f. (U) Continue development of integration methodology and identification of trusted products for MLS in operational systems.
4. (U) FY 1993 PLANS:
   a. (U) Continue developing trusted products for integrated MCCR.
   b. (U) Continue evaluating MLS in OSA.
   c. (U) Continue CIEL development.
   d. (U) Complete Secure Systems Implementation requirements definition.
   e. (U) Begin Secure Systems Implementation Architecture selection.
   f. (U) Continue development of integration methodolody and identification of trusted products for MLS in operational systems.
5. (U) PROGRAM TO COMPLETION: This a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, D.C., NAVSWC, Dahlgren, VA. MAJOR CONTRACTOR: None.

F. (U) RELATED ACTIVITIES:
   PE 0301567G Consolidated Computer Security Program
   PE 0602301E Strategic Technology
   PE 0602234N System Support Technology

G. (U) OTHER APPROPRIATION FUNDS: None. This is a non-acquisition program.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY
PROGRAM ELEMENT: 0604574N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Standard Embedded Computer Resources (SECR)
PROJECT NUMBER: X1976 PROJECT TITLE: Next Generation Computer Resources (NGCR)

A. (U) RESOURCES (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X1976	NGCR	13,043	11,892	19,332	23,392	CONT.	CONT.

B. (U) DESCRIPTION: The Next Generation Computer Resources (NGCR) program will establish a set of Navy and industry jointly defined computer hardware and software interface standards and take maximum advantage of ongoing commercial trends and standardization in these three major areas:

MultiProcessor Interconnect	Multisystem Interconnects	Software
Backplane	Local Area Net - SAFENET I	Operating System (OS)
High Performance Backplane	Local Area Net - SAFENET II	Database Mgmt. Sys.
High Speed Data Transfer Network	High Performance Local Area Network (LAN)	Program Support Environment
		Graphics Language and Interface

The NGCR program encompasses or is affiliated with all future embedded computer resources for the full range of Navy MCCR shipboard, aircraft and shore-based systems. NGCR standards will provide for a wide range of functions from data manipulation and communications routing to signal and symbolic processing.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS

1. (U) FY 1990 ACCOMPLISHMENTS:

a. (U) Started SAFENET interim certification capability to support early user (NCCS Afloat and others) program schedules.

b. (U) Began engineering studies for High Speed Data Transfer Network, Data Base Management System (DBMS), Programming Support Environment (PSE), and Graphics interface standards.

c. (U) Continued industry/Navy working groups for definition of interface standards for Backplane, Operating System (OS), and SAFENET I & II LANs

d. (U) Continued interface with industry in defining a MIL-SPEC for "ruggedized commercial equipment".

e. (U) Continued developing Integrated Logistics Support Plan (ILSP).

f. (U) Continued developing certification methodology and procedures.

g. (U) Awarded Backplane and SAFENET I & II LANs laboratory test model contracts.

h. (U) Published SAFENET I LAN interface standard and handbook (Review Copy).

i. (U) Published draft interface standards for Backplane and SAFENET II LAN.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY
PROGRAM ELEMENT: 0604574N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Standard Embedded Computer Resources (SECR)
PROJECT NUMBER: X1976 PROJECT TITLE: Next Generation Computer Resources (NGCR)

2. (U) FY 1991 PROGRAM:
a. (U) Start engineering studies for High Performance LAN (HP LAN).
b. (U) Start Backplane and SAFENET I & II LANs systems integration support with user programs.
c. (U) Establish industry/Navy working group to define standards for High Speed Data Transfer Network (HSDTN) and Program Support Environment (PSE).
d. (U) Publish SAFENET I LAN MIL-Std and MIL-Handbook.
e. (U) Continue Backplane and SAFENET I & II LANs standards laboratory test model contracts.
f. (U) Award OS standards laboratory test model contracts (Ada compilation system)
g. (U) Continue development of certification methodology and procedures.
h. (U) Continue Working Groups to define and to publish Backplane, SAFENET I &II LANs, and OS interface standards.
i. (U) Continue engineering studies for DBMS, and Graphics interface standards.
j. (U) Continue defining a MIL-SPEC for "ruggedized commercial equipment".
k. (U) Continue SAFENET LAN interim certification testing to support initial standards users.
l. (U) Publish draft SAFENET II LAN interface standard and handbook.
3. (U) FY 1992 PLANS:
a. (U) Begin conformance test capability and certification for Backplane and SAFENET I & II LANs.
b. (U) Establish industry/Navy working groups to define interface standards for DBMS, Graphics, and HP LAN.
c. (U) Start Architectural Test Bed requirements analysis.
d. (U) Continue Backplane and SAFENET I and II LANs systems integration support with users programs.
e. (U) Continue industry working groups to define and to publish interface standards: Backplane, SAFENET I & II LANs, OS, HSDTN, and PSE.
f. (U) Award OS standard laboratory test model contracts (analysis and design).
g. (U) Complete Backplane, SAFENET I & II LANs standards laboratory test model contract.
h. (U) Complete definition of MIL-SPEC "Ruggedized Commercial Equipment".
i. (U) Continue developing certification methodology and procedures.
j. (U) Publish Backplane and SAFENET II MIL- STD.
k. (U) Complete baseline conformance test procedures for Backplane and SAFENET I&II LANs.
l. (U) Milestone II decision.
m. (U) Complete OS standards laboratory test model contract (Ada compilation system).
4. (U) FY 1993 PLANS:
a. (U) Establish industry/Navy working group to define High Performance Backplane standards.
b. (U) Begin OS conformance test procedure development.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604574N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Standard Embedded Computer Resources (SECR)
PROJECT NUMBER: X1976 PROJECT TITLE: Next Generation Computer Resources (NGCR)

c. (U) Continue industry/Navy working groups to define and publish High Speed Data Transfer Network, SAFENET I & II LAN, HP LAN, OS, DBMS, PSE, Graphics Interface standards to satisfy Next Generation Computer user requirements.

d. (U) Continue conformance test capability for Backplane and SAFENET I and II LANs.

e. (U) Complete Architectural Test Bed requirements analysis.

f. (U) Continue Backplane and SAFENET I and II LANs systems integration support with users programs.

g. (U) Continue development of certification methodology and procedures.

5. (U) PROGRAM TO COMPLETION: This is a continuing program to derive interface standards based on industry standardization trends for the Navy's Next Generation Computer Resources.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVOCEANSYSCEN, San Diego, CA.; NAVAIRDEVCEN, Warminster, PA.; NAVAVIONICCEN, Indianapolis, IN.; NAVSWC, Dahlgren, VA.; NAVAIRTESTCEN, Patuxent River, MD.; NAVWPNCEN, China Lake, CA.; NUSC, Newport, RI. ; NAVWPNSUPPCEN, Crane, IN. CONTRACTORS: Numerous companies participating in the working groups (at their expense). Competitive contracts awarded with Cable & Computer Technology, Anaheim, CA; Litton Systems, Pascagoula, MS; and Raytheon, Sudbury, MA.

E. (U) COMPARISON WITH THE FY 1991 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: NONE
2. (U) SCHEDULE CHANGES: NONE
3. (U) COST CHANGES: NONE

F. (U PROGRAM DOCUMENTATION:

Operational Requirement	08/88
Acquisition Plan	06/89
Program Master Plan	06/89

G. (U) RELATED ACTIVITIES: The following Program Elements fund the development of broadbase computer systems technology and products providing the basis for transition to the NGCR Program under project X1976.

Program Element 0601101E, Defense Research Sciences
Program Element 0602301E, Strategic Technologies
Program Element 0602708E, Integrated Command and Control Technology
Program Element 0603223C, Systems Concepts and Battle Management

H. (U) OTHER APPROPRIATION FUNDS: None.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

J. (U) MILESTONE SCHEDULE:

Milestone I - 2Q FY89
Milestone II - 4Q FY92
Milestone III - 2Q FY96

FY 1992/93 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604574N BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: STANDARD EMBEDDED COMPUTER RESOURCES (SECR)

PROJECT NUMBER: W0845 PROJECT TITLE: AN/AYK-14(V)

C. (U) DESCRIPTION: Navy Standard Airborne Computer (AN/AYK-14) project provides for airborne digital computer requirements. The objective is to reduce proliferation of unique Contractor Furnished Equipment computer systems (hardware and software tools). A standard design, flexible enough to permit its use in a wide variety of applications has been developed. Design flexibility permits technology infusion which keeps pace with new requirements through pre-planned product improvements. Very High Speed Integrated Circuit (VHSIC) infusion, funded in part by DOD, will provide user aircraft up to 18 million instructions per second (MIPS) processing power. The AN/AYK-14(V) is supplied as GFE to Navy weapon systems including the F/A-18, F-14D, AV-8B, E-2C, EA-6B, SH-60B, EP-3, Automatic Carrier Landing System, MK-50 torpedo, CV-FTAS, VP-FTAS, and Army JSTARS.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. (U) Continued development of VHSIC processor circuitry.
   b. (U) Started delivery of VHSIC preproduction units.
2. (U) FY 1991 Program:
   a. (U) Complete VHSIC-based AYK-14(V) computer qualification.
   b. (U) Start VHSIC production deliveries.
   c. (U) Continue follow-on development of state-of-the-art technology improvements for the AN/AYK-14(V) in support of user requirements. These include:
   (1) (U) Begin developing a 50 MHz serial High Speed Data Bus (HSDB) module to alleviate F/A-18 input/output deficiencies and serve as the high throughput bus for future generation airborne computer standards.
   (2) (U) Begin development of an Interactive Voice I/O Module with AV-8B to enable voice control of the mission computer, radios and weapon system.
   (3) (U) Begin developing an embedded Video Processor Module Set to reduce aircraft weight (by 43 pounds) and reduce video latency when switching between display formats (up to 10 seconds).
   (4) (U) Begin developing a 32-bit AYK-14(V) configuration for the E-2C and other current generation aircraft (embedded co-processor).
   (5) (U) Begin concept formulation of an embedded GPS module set.
3. (U) FY 1992 Plans:
   a. (U) Complete developing the High Speed Data Bus module.
   b. (U) Continue developing the Video Processor module set, the 32-bit AYK- 14 and the GPS module set.
4. (U) FY 1993 Plans:
   a. (U) Complete developing Video Processor and the GPS modules.
   b. (U) Complete qualification of the 32-bit AYK-14(V).
5. (U) Program to Completion:
   a. (U) This is a continuing program of cost-effective, pre-planned upgrades to the AYK-14 standard mission computers of today's aircraft weapon and support systems.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAC, Indianapolis, IN; NADC Warminster, PA; NATC, Patuxent River, MD; NSWC, Silver Spring, MD. CONTRACTORS: Control Data Corporation, Minneapolis, MN; UNISYS, St. Paul, MN; UNISYS, Pueblo, CO.

F. (U) RELATED ACTIVITIES: Not Applicable.

G. (U) OTHER APPROPRIATION FUNDS:

APPN/P-1	FY1990	FY1991	FY1992	FY1993	TO COMPLETE	TOTAL PROGRAM
APN/4,7,9,11,23	Procurement justification material does not contain this level of detail.					

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604577N **BUDGET ACTIVITY:** 5
PROGRAM ELEMENT TITLE: Extremely High Frequency Satellite

A. (U) RESOURCES: (Dollars in Thousands)

Project Number	Title	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X0728	Extremely High Frequency Satellite Communications Terminals	19,963	17,264	33,686	28,118	Cont.	Cont.
X1660	Navy Fleet Satellite Communications Extremely High Freq. Package	1,961	0	0	0	0	1,961
TOTAL		21,924	17,264	33,686	28,118		Cont.

B. (U) DESCRIPTION: This program develops Navy Extremely High Frequency Satellite Communications terminals and two Navy satellite communication packages. The terminals will be compatible with the joint service Milstar System. The terminals and satellite system meet a fleet requirement for survivable, reliable, wartime, low probability of intercept, anti-jam communications under projected threat environments. The Fleet Satellite Communications Extremely High Frequency Package (FEP) is providing an orbital test and evaluation capability to support Army, Navy and Air Force terminal production decisions prior to Milstar deployment, and provide an early, limited operational capability.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604577N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Extremely High Frequency Satellite Communications
PROJECT NUMBER: X0728 PROJECT TITLE: Navy EHF Satellite Communications Terminals

POPULAR NAME: NESP

A. (U) SCHEDULE/BUDGET INFORMATION: (DOLLARS in thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	TOTAL PROG TO COMPLETE
Program Milestones		MS IIIB 5/91	Complete 1ST Art. Test 12/91	Term IOC 9/93	
Engineering Milestones			IXS PDR PROTOTYPE DEMO 10/91	IXS ENGR MODEL DEMO 6/93	
T&E Milestones	DT-IIG 12/89 TECHEVAL 2/90 OPEVAL 9/90	MT-III 10/90 DT-IIJ 7/91	DT-IIK 4/92		
Contract Milestones	Limited Prod. Award 2/90		Full Prod. Award 12/91	Follow-on Award 9/93	

BUDGET ($K) Prog. Total	FY 1990	FY 1991	FY 1992	FY 1993	TOTAL PROG TO COMPLETE
Major Contract	12,663	9,117	24,249	20,377	Cont.
Support Contract	2,065	2,444	1,824	1,655	Cont.
In-House Support	5,152	5,625	7,561	6,032	Cont.
GFE/Other	83	78	52	54	Cont.
Total	19,963	17,264	33,686	28,118	Cont.

PROGRAM ELEMENT: 0604577N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Extrem. High Freq. Satellite Communications
PROJECT NUMBER: X0728 PROJECT TITLE: Navy EHF Satellite Comms Program

B.(U) DESCRIPTION:

(U) Navy Extremely High Frequency Satellite Communications Program provides for the development and production of terminals to provide wartime communications capability for Command and Control of the fleet. The terminals will provide physical and electro- magnetically survivable, worldwide anti-jam and low probability of intercept communications in the current and projected electromagnetic and nuclear threat. The increased capability to be provided by Extremely High Frequency Satellite Communications terminals is accomplished by use of the wider bandwidths available at extremely high frequencies, narrow antenna beamwidths, spread spectrum techniques, on-board satellite processing and advanced signal processing technology.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   - a. (U) Completed Phase II Terminal Performance Testing (DT-IIG)
   - b. (U) Completed TECHEVAL
   - c. (U) Completed OPEVAL
   - d. (U) Conducted Milstar joint service testing under Milstar Joint Test Plan
   - e. (U) Began design of operator and maintenance training system
   - h. (U) Began Tri-Service Interoperability Testing

2. (U) FY 1991 Program:
   - a. (U) Perform Milstar and Tri- Service Interoperability Testing
   - b. (U) Continue development of emergent Milstar mods
   - c. (U) Continue follow-on testing with on-orbit EHF pkg
   - d. (U) Commence EHF antenna group engineering changes
   - e. (U) Development and demonistration of an EHF Information Exchange (IXS) Systems Interface Unit prototype
   - f. (U) Perform user systems integration testing

3. (U) FY 1992 Plans:
   - a. (U) Conduct First Article Testing
   - b. (U) Begin delivery of production terminals
   - c. (U) Continue Milstar Tri-service testing
   - d. (U) Continue evolution of EHF IXS PROTOTYPE
   - e. (U) Begin Milstar protocol Mod Block upgrade development
   - f. (U) Commence UFO Interoperability Testing
   - g. (U) Complete Milstar Satellite Compatability Testing

PROGRAM ELEMENT: 0604577N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Extrem. High Freq. Satellite Communications
PROJECT NUMBER: X0728 PROJECT TITLE: Navy EHF Satellite Comms Program

4. (U) FY 1993 Plans:
   a. (U) Achieve Terminal IOC.
   b. (U) Conduct Terminal FOT&E and System IOT&E with Milstar
   c. (U) Continue Milstar and Tri-Service Interoperability testing
   d. (U) Continue development of Milstar Interoperability/protocol mods and evolution of EHF IXS PROTOTYPE
   e. (U) Install PROTOTYPE UHF IXS capability with terminals.
   f. (U) Continue UFO Interoperability Testing.

5. (U) PROGRAM TO COMPLETION:
   This is a continuing program.

D. (U) WORK PERFORMED BY: In-House: Lead laboratory is NAVOCEANSYSCEN, San Diego, CA; NUSC, New London, CT; NAVELEXSYSENGCEN, Vallejo, CA; NRL, Washington, DC; NAVSWC, White Oak, MD; NAVELEXSYSENGCEN, Charleston, SC. Contractors: Raytheon, Sudbury, MA; Booz, Allen & Hamilton Inc., Bethesda, MD.

E. (U) COMPARISON WITH REVISED FY 1991 PRESIDENT'S BUDGET:

1. (U) TECHNICAL CHANGES: None
2. (U) SCHEDULE CHANGES: None
3. (U) COST CHANGES: None

F. (U) PROGRAM DOCUMENTATION:
   DCP X0728, 4/89
   TEMP Number 784 (Rev. 1), 4/89 (update expected 1/91)
   Joint Milstar Communications Control and Operations Concept (JMCCOC) Vol I (1ST Rev.- 6/89) and Vol II (1ST Rev.- 8/89)
   Milstar Multi-service TEMP, 2/88 (update expected 4/91)

PROGRAM ELEMENT: 0604577N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Extrem. High Freq. Satellite Communications
PROJECT NUMBER: X0728 PROJECT TITLE: Navy EHF Satellite Comms Program

G. (U) RELATED ACTIVITIES:
- a. (U) PE 0303601F, Air Force Satellite Communications
- b. (U) PE 0303603F, Milstar
- c. (U) PE 0303603N, Milstar Joint Terminal Program Office
- d. (U) PE 0303142A, Extremely High Frequency Communications Terminal
- e. (U) PE 0602721N, Navy Extremely High Frequency Exploratory Development Program

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 Actual	FY 1991 Estimate	FY 1992 Estimate	FY 1993 Estimate	To Complete	Total Program
OPN *	76,803	93,514	148,520	121,984	Cont.	Cont.

* Includes completion of first article test funding and procurement of data, submarine report back processors, depot equipment and fleet maintenance activity equipment, in addition to NESP terminals and installation cost for those terminals.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE

J. (U) TEST AND EVALUATION DATA: NOT APPLICABLE

FY 1992/93 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604601N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Mine Development (Engineering)

A. (U) RESOURCES: (Dollars in thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0267	Mine Improvements	4,925	5,384	2,838	1,847	Cont	Cont
S0272	Quickstrike	6,338	6,856	6,125	6,288	Cont	Cont
Total		11,263	12,240	8,963	8,135	Cont	Cont

B. ( ) DESCRIPTION: This program provides for engineering, development, support systems, test models, tests, and other Mine Warfare related research and development to counter current and future enemy submarines and surface ships. The Mine Improvements project (S0267) is specifically aimed at improving existing mine subsystems or components to maintain operational effectiveness, quality, and reliability. Efforts include elements such as: sensors, software, power supplies, flight gear, and training systems. The Quickstrike (S0272) is for development of major subsystems of mines. Current specific elements are the Target Detecting Device MK71 and the Safety-Arming Device MK75.

FY 1992/93 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604601N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Mine Development (Engineering)
PROJECT NUMBER: S0267 PROJECT TITLE: Mine Improvements

C. ( ) DESCRIPTION: Through research and engineering, including modeling and testing, develop capability improvements to mine subsystems and components. Developments may be quick-response to meet an urgent performance requirement, or may be long-term to ensure continued effectiveness and quality of the Navy mine stockpile. Ongoing or planned efforts are:

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. (U) Continued improvements to data acquisition and analysis, software/logic, and minefield model applications.
   b. (U) Completed development of the MK164 Flight Gear Kit.
   c. (U) Supported the Advanced Bomb Family and Insensitive Munitions Programs.
   d. (U) Completed specification for the MK146 lithium battery.

2. (U) FY 1991 Program: Complete development of integrated data format and validation of magnetic/pressure facility. Continue improvements in software/logic, minefield model applications, and support for the Advanced Bomb Family and Insensitive Munitions programs. Begin follow-on tests of the MK164 Flight Gear Kit.

3. (U) FY 1992 Plans: Complete follow-on test program for MK164 Flight Gear Kit. Continue improvements in mine sensors, software/logic, and model applications; continue support for the Advanced Bomb Family and Insensitive Munitions programs. Begin development of lithium power supply for MK71 Target Detecting Device (TDD).

4. (U) FY 1993 Plans: Complete algorithms for UEP and enhanced pressure sensors. Continue improvements in sensors, flight gear, power sources, software/logic, and model applications; continue support for the Advanced Bomb Family and Insensitive Munitions programs.

5. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: In-house: NSWC, White Oak, MD; and Naval Mine Warfare Engineering Activity, Yorktown, VA. Contractors: Yardney-Whitaker, Waltham, MA.

F. (U) RELATED ACTIVITIES: Mine Improvements projects are interfaced and integrated with Program Element 0604601N-S0272, Mine Systems Development; and Program Element 0603601N-S2024, Mine MK 60 (CAPTOR) Improvement/Adv. ASW Mine (SUBSTRIKE).

G. (U) OTHER APPROPRIATION FUNDS: None.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

FY 1992/93 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604601N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Mine Development (Engineering)
PROJECT NUMBER: S0272 PROJECT TITLE: Quickstrike

C. ( ) DESCRIPTION: QUICKSTRIKE series mines are a family of modern bottom mines adapted from 500/1,000/2,000 lb. general-purpose bombs and a 2,000 lb. MK65 mine, coupled with associated Safety and Arming (S/A) Devices, Flight Gear, and Target Detecting Devices (TDD). This program develops a new Target Detecting Device TDD MK71 used in the QUICKSTRIKE Mod 3 system. Also included are Safety and Arming Devices, Flight Gear, and test equipment.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:
1. (U) FY 1990 Accomplishments:
   a. (U) Continued FSED of the QUICKSTRIKE Mod 3 System/TDD MK71.
2. (U) FY 1991 Program:
   a. (U) Continue contractor FSED of the QUICKSTRIKE Mod 3 System/TDD MK71.
   b. (U) Begin TECHEVAL of the QUICKSTRIKE Mod 3 System/TDD MK71and S/A MK75.
3. (U) FY 1992 Plans:
   a. (U) Complete TECHEVAL of the QUICKSTRIKE Mod 3 System/TDD MK71 and S/A MK75.
   b. (U) Begin OPEVAL of the QUICKSTRIKE Mod 3 System/TDD MK71 and S/A MK75.
4. (U) FY 1993 Plans:
   a. (U) Complete OPEVAL of the QUICKSTRIKE Mod 3 System/TDD MK71 and S/A MK75.
   b. (U) Obtain Approval for Full Rate Production (AFRP) of the QUICKSTRIKE Mod 3 System/TDD MK71 and S/A MK75.
5. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: In-house: NSWC, White Oak, MD and NAVMINEWARENGACT, Yorktown, VA. Contractors: Sparton Defense Electronics, Jackson, MI.

F. (U) RELATED ACTIVITIES: Mine Improvements (PE 0604601N-S0267)

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMP.	TOTAL PROGRAM
(U) PROCUREMENT WPN #40	17,716	16,096	11,417	9,531	Cont.	Cont.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604602N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Naval Gunnery Improvement

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 90 ACTUAL	FY 91 EST	FY 92 EST	FY 93 EST	TO COMPL	TOTAL PROGRAM
S0178	Gun Fire Control Systems Improvements	2,708	2,340	2,351	2,593	CONT	CONT
S1706	Ballistic Ammo Improvements	765	4,187	2,162	2,370	CONT	CONT
S1894	16" Naval Gun Improvement	6,662	0	0	0		
TOTAL		10,135	6,527	4,513	4,963	CONT	CONT

B. (U) DESCRIPTION: The Naval Gunnery Improvement Program provides for research and development in all areas of Naval Gunfire. Specifically, this program funds all ongoing analysis of and improvements to naval gunfire control systems, guns and gun ammunition.

PROGRAM ELEMENT: 0604602N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Naval Gunnery Improvement
PROGRAM NUMBER: S0178 **PROJECT TITLE:** Gun Fire Control System Improvement

C. (U) **DESCRIPTION:**

1. (U) MK 86 Gun Fire Control System (GFCS) provides control of 5"/54 gun mounts and guides SM-1 and SM-2 missiles on destroyers, guided missile destroyers and cruisers, and helicopter assault ships for area and self-defense against air and surface craft. Improvements will improve war-fighting capability.

2. (U) MK 160 Gun Computing System (GCS) provides gun fire control interface between AEGIS weapon system and 5"/54 gun mount on DDG-51 Class ships. Improvements will improve war-fighting capability.

3. (U) EX 46 Optical Sight provides electro-optical (E/O) target data to the MK 34 Gun Weapon System (GWS) which includes MK 160 GCS and potentially to other gun fire control systems.

D. (U) **PROGRAM ACCOMPLISHMENTS AND PLANS:**

1. (U) FY 1990 ACCOMPLISHMENTS:

a. (U) Established MK 86 GFCS performance baseline. Complete test and evaluation of Moving Target Indicator/Low Noise Front End (MTI/LNFE) for AN/SPQ-9A Surface radar. Developed efficient computer memory usage program for MK 86 GFCS. Continued development and test of High Speed Maneuvering Surface Target (HSMST) modification for MK 86 GFCS. Developed, tested, and installed ORDALTs for AN/SPG-60 radar (MK 86 GFCS) in DDG-993 and CGN-38 ships to improve Standard Missile control capabilities.

2. (U) FY 1991 PROGRAM:

a. (U) Update MK 86 GFCS performance baseline. Complete development of MK 86 efficient memory usage. Complete development of HSMST modification for MK 86 GFCS. Develop and test product improvements to MK 86 GFCS to increase detection of small, low-flying, missiles and aircraft. Develop and integrate E/O capability in MK 86 GFCS.

b. (U) Integrate E/O capability into MK 160 Gun Computing System (GCS). Develop extended E/O range of EX 46 optical Sight.

3. (U) FY 1992 PLANS:

a. (U) Update MK 86 GFCS performance baseline. New Start. Initiate development of second tracking and illumination channel for NATO SEA Sparrow Missile System (NSSMS). New Start. Initiate development of product improvement of Video Processor MK 2 MOD 3 to provide improved target filtering and detection. Continue integration of E/O capability in MK 86 GFCS.

b. Continue development, test, and integration of E/O capability into MK 160 GCS. Continue development of extended E/O range capability of EX 46 Optical Sight.

4. (U) FY 1993 PLANS:

a. (U) Update MK 86 GFCS performance baseline. Continue development and test of second tracking and illumination channel for NSSMS. Continue development of product improvement for MK 86 GFCS of MK 2 MOD 3 Video Processor. Complete integration of E/O capbability in MK 86 GFCS.

b. (U) Complete integration of E/O capability in MK 160 GCS. Continue development, test, and integration of extended E/O range of EX 46 Optical Sight.

5. (U) PROGRAM TO COMPLETION: Continuing program.

E. (U) **WORK PERFORMED BY: IN-HOUSE:** MK 86 GFCS: NSWSES Port Hueneme, Ca.; MK 160 GCS: NOS/Louisville, Ky.; EX 46 OS: NOS/Louisville, Ky. **CONTRACTORS:** MK 86 GFCS: Lockheed/Sanders Inc., Nashu NH.; MK 160 GCS: Unisys, Great Neck, NY.; EX 46 OS: Kollmorgen, Northampton, Ma.

F. (U) **RELATED ACTIVITIES:** NONE

G. (U) **OTHER APPROPRIATION FUNDS:** N/A

H. (U) **INTERNATIONAL COOPERATIVE AGREEMENTS:** NONE

PROGRAM ELEMENT: 0604602N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Naval Gunnery Improvement
PROJECT NUMBER: S1706 PROJECT TITLE: Ballistic Gun Ammo Improvements

C. (U) DESCRIPTION: This project encompasses the engineering development of a 5"/54 Low Vulnerability Ammunition (LOVA) propelling charge. This charge will provide extended range for the 5"/54 MK 64 type projectiles and will increase ship survivability by minimizing propellant fires and explosions caused by fragments, shaped-charge jets, etc. In addition, this program will join a Navy, Marine Corps program for 25MM Advanced Multi-Purpose Ammunition, and also develop ammunition for the Advanced Gun Weapon System(GWS), Advanced Minor Caliber Gun, and CIWS Training Round Development.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS

1. (U) FY 1990 Accomplishments:

a. (U) Initiated hot-gun cookoff safety tests of LOVA propelling charge and MK 64 projectile in 5"/54 text fixture.

b. (U) Conducted analysis to support Gun and Ammunition improvements for Advanced GWS.

2. (U) FY 1991 Program:

a. (U) Complete hot-gun cookoff safety tests of LOVA charge and MK 64 projectile in 5"/54 gun.

b. (U) Conduct feasibility demonstration of LOVA charge with MK 64 projectiles.

c. (U) Initiate development of 25MM Advanced Multi-Purpose Ammunition. This is a joint NAVAIR, Marine Corps, and NAVSEA funded program. Improved round will provide improved effectiveness and standardization.

d. (U) Continue analysis of improvement to ballistic ammunition for Advanced GWS.

e. (U) Begin and complete study to determine feasibility of developing a ballistically matched training round for the Close-in Weapon System (CIWS).

3. (U) FY 1992 Plans:

a. (U) Initiate Design Verification Test (DVT) of 5"/54 LOVA propelling charge.

b. (U) Initiate Technical Evaluation of 5"/54 LOVA propelling charge.

c. (U) Full Scale Development Contract for 25MM Advanced Multi-Purpose Ammunition.

d. (U) Initiate development of ballistically matched training round for CIWS.

4. (U) FY 1993 Plans:

a. (U) Conduct Technical Evaluation of 5"/54 LOVA propelling charge.

b. (U) Obtain approval for production of 5"/54 LOVA propelling charge.

c. (U) Complete Technical Evaluation of 25MM Advanced Multi-Purpose Ammunition.

d. (U) Initiate development of ballistically matched training round for CIWS.

5. (U) Program to Completion: Continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NOS Indian Head; NSWC Dahlgren; NWSC Crane; CONTRACTORS: TBD.

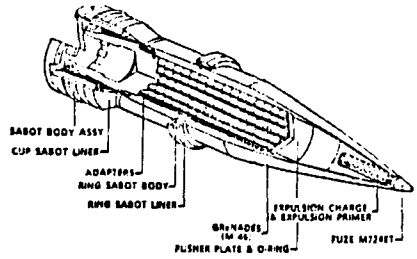
F. (U) RELATED ACTIVITIES: Joint 25MM Advanced Multi-Purpose Ammunition.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604602N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Naval Gunnery Improvement
PROJECT NUMBER: S1894 **PROJECT TITLE:** 16" Naval Gun Improvements



A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	TO COMPLETE
Program Milestones					
Engineering Milestones					
T&E Milestones					
Contract Milestones					

BUDGET (SK)	FY 1990	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL TO COMPLETE
Major Contract	1200	0	0	0	3800/0
Support Contract	300	0	0	0	940/0
In-House Support	5112	0	0	0	15567/0
GFE/ Other	50	0	0	0	160/0
TOTAL	6662	0	0	0	20467/0

B. (U) DESCRIPTION: This project provides development of longer range, more effective ammunition, and supporting improvements to the fire control system to increase accuracy and lethality of the 16"/50 gun system. A 13" saboted projectile will be developed to deliver dual purpose submunitions to ranges greater than conventional ammunition. Compatibility with the FCS will be incorporated into the digital upgrade to the FCS.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604602N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Naval Gunnery Improvement
PROJECT NUMBER: S1894 **PROJECT TITLE:** 16" Naval Gun Improvements

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS

1. (U) FY 1990 Accomplishments:

a. (U) Complete initial projectile performance and shipboard compatibility tests.

b. (U) Develop FCS drawings/documentation.

2. (U) FY 1991 PROGRAM: Terminate program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NOS Louisville, KY; NSWC Dahlgren, VA.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
1. (U) Technical changes: None.
2. (U) Schedule changes: None.
3. (U) Cost changes: None.

F. (U) PROGRAM DOCUMENTATION:

CM Plan	OCT 86
OR	OCT 86
DCP	OCT 86
TEMP	MAY 90
TRANSITION PLAN	AUG 90

G. (U) RELATED ACTIVITIES: Not applicable.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: Not applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604603N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: UNGUIDED CONVENTIONAL AIR LAUNCHED WEAPONS
A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W1341	Airborne Guns and Ordnance	4,361	3,595	8,389	9,911	Cont.	Cont.
W1844	BDU and A/C Interface	3,129	0	0	0		
	TOTAL	7,490	3,595	8,389	9,911	Cont.	Cont.

B. (U) DESCRIPTION:

(1) (U) Project W1341 is a continuing program improving Navy and Marine Corps air launched weapons. Major items in this program are the 2.75 inch rocket motor and warhead improvements which will become part of the projected Advanced Rocket and the 25MM Advanced Multipurpose Projectile (AMP) which will become the universal projectile for use in all Department of the Navy (DON) 25MM gun systems.

(2) (U) Project W1844 develops and integrates the Bomb Dummy Unit (BDU-53) for testing and certifying aircraft and aircrews to use the B90 Nuclear Depth/Strike Bomb (NDSB). The scope of work encompasses prototype design and fabrication, laboratory testing, design of production representative items, initial production planning, and BDU aircraft integration efforts. This is in support of OR 196-05-88.

PROGRAM ELEMENT: 0604603 BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: UNGUIDED CONVENTIONAL AIR LAUNCHED WEAPONS
PROJECT NUMBER: W1341 PROJECT TITLE: AIRBORNE GUNS AND ORDNANCE

C. (U) DESCRIPTION: Ongoing effort to develop and modernize air launched weapons. Program consists of 2.75 inch rocket motor, warheads and launcher improvements. The Advanced Rocket System (ARS) is scheduled to replace the 2.75 inch and 5 inch rockets in 1995. This effort will provide the fleet with significantly improved war fighting capability.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. (U) Completed the Engineering test report on the French over-wrap Composite Motor Case.
   b. (U) Completed risk assessment/trade-off analysis for the ARS.
   c. (U) Completed NAVAIR Logistics Review Audit
2. (U) FY 1991 Program:
   a. (U) Obtain MS-II approval to commence ARS FSD.
   b. (U) Complete the Foreign Weapons Evaluation (FWE) of the high impulse 2.75-inch rocket motor and NCT of anti-ship and anti-material warheads.
   c. (U) Begin ARS aircraft integration efforts.
3. (U) FY 1992 Plans:
   a. (U) Award ARS FSD contract.
   b. (U) Begin ARS FSD.
   c. (U) Continue aircraft integration efforts.
4. (U) FY 1993 Plans:
   a. (U) Continue ARS FSD
   b. (U) Continue ARS aircraft integration efforts.
5. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NWC China Lake, CA; NWSC, Dahlgren, VA; PMTC, Point Mugu, CA; NOS, Indian Head, MD; NWSC, Crane IN; NATC Patuxent River, MD; Contractors: TBD.

F. (U) RELATED ACTIVITIES: Not Applicable.

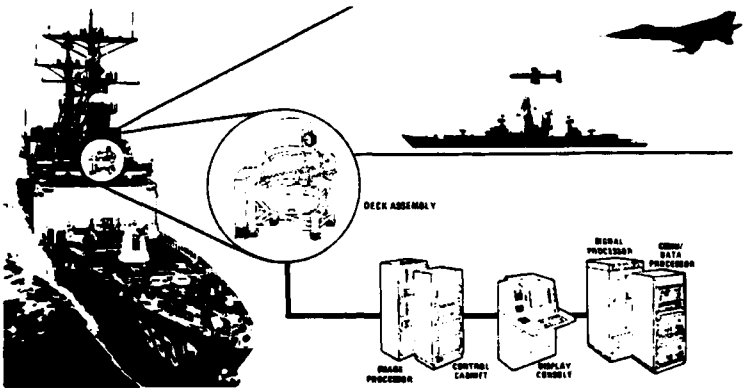
G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL (OPN)	FY 1991 ESTIMATE (WPN)	FY 1992 ESTIMATE (WPN)	FY 1993 ESTIMATE (WPN)	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT						
APPN/P-1						
P-1 #57 2.75	13,803	14,635	10,699	27,470	cont.	cont.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: For ARS the following programs are being evaluated under the NATO Comparative Test Program funded with Foreign Weapon Evaluation funds and are into the third year of evaluation: Rocket motor - Canada - Bristol Co.; Warhead - France - Thompson Brandt Co.; Warhead - Norway - Raufoss Co.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604608N BUDGET ACTIVITY: 4 - Tactical Programs
PROGRAM ELEMENT TITLE: SURFACE ELECTRO-OPTIC SYSTEMS
PROJECT NUMBER: S0665 PROJECT TITLE: Infrared Search and Target Designation (IRSTD) System



POPULAR NAME: Infrared Search and Target Designation

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	TO COMPLETE
Program Milestones		MS IIIA			
Engineering Milestones		SYS FCA/PCA			
T&E Milestones	LBT	DT/IOT&E			
Contract Milestones		EDM#2 DEL			

BUDGET ($K)	FY 1990	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL TO COMPLETE
Major Contract	15,154	3,893	0	0	86,000 0
Support Contract	600	600	0	0	5,100 0
In-House Support	4,302	5,659	0	0	27,000 0
GFE/ Other	315	360	0	0	6,600 0
TOTAL	20,371	10,512	0	0	124,700 0

PROGRAM ELEMENT: 0604608N BUDGET ACTIVITY: 4 - Tactical Programs
PROGRAM ELEMENT TITLE: SURFACE ELECTRO-OPTIC SYSTEMS
PROJECT NUMBER: SO665 PROJECT TITLE: Infrared Search and Target Designation (IRSTD) System

B. (DESCRIPTION:
The sophistication and diversity of threats facing naval surface combatants is increasing

that will continue to be effective in the face of these technological
This program element provides funding for the cooperative U.S./Canadian development of an Infrared Search and Target Designation (IRSTD) System, AN/SAR-8, a device that is relatively immune to the adverse effects of these phenomena. The AN/SAR-8 is a passive surveillance device

. Additionally, the AN/SAR-8 will passively

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS

1. (U) FY 1990 ACCOMPLISHMENTS:
   a. (U) Initial system Checkout of EDM#1 at LBTS completed
   b. (U) Performance Testing of EDM#1 against aircraft initiated
   c. (U) CDR for TAS Sensor Integration conducted

2. (U) FY 1991 PROGRAM:
   a. (U) Continue LBT with EDM #1
   b. (U) Complete computer program development and problem correction
   c. (U) Complete I&T of EDM #2 and deliver system
   d. (U) Install EDM #2 in NSSMS ship
   e. (U) Complete DT/IOT
   f. (U) Conduct Functional Configuration Audit/Physical Configuration Audit (FCA/PCA)
   g. (U) Conduct Logistics Readiness Review
   h. (U) Conduct Milestone IIIA

3. (U) FY 1992 AND OUT PLANS: Program completes.

D. (U) WORK PERFORMED BY: IN-HOUSE: Naval Surface Warfare Center, Dahlgren, VA and White Oak, MD; Naval Ship Weapon Systems Engineering Station, Port Hueneme, CA; Naval Weapons Analysis Center, Naval Weapons Station, Seal Beach, CA; Naval Weapons Support Center, Crane, IN.

CONTRACTOR: Canadian Commercial Corporation (CCC), Ottawa, Ontario, (Canadian Government Contracting Agency); SPAR Aerospace, Toronto; General Electric Company, Utica, NY; Scientific-Atlanta, Atlanta, GA; Computing Devices Company, Ottawa, Ontario.

PROGRAM ELEMENT: 0604608N BUDGET ACTIVITY: 4 - Tactical Programs
PROGRAM ELEMENT TITLE: SURFACE ELECTRO-OPTIC SYSTEMS
PROJECT NUMBER: SO665 PROJECT TITLE: Infrared Search and Target Designation (IRSTD) System

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) TECHNICAL CHANGES: None

2. (U) SCHEDULE CHANGES: The development program will continue through completion of Milestone IIIA testing.

3. (U) COST CHANGES: Additional FY 1990 funding supports increased estimated cost to complete.

F. (U) PROGRAM DOCUMENTATION:
1. (U) OR: AA-10 approved May 75.
2. (U) DCP: Signed by OP-03 and OP-91 Sep 90. Awaiting ASN signature
3. (U) TEMP: In chop for forwarding to OPTEVFOR
4. (U) AP: Approved Nov 90.

G. (U) RELATED ACTIVITIES: TAS MK23 upgrades for integration with AN/SAR-8 on test ship covered in P.E. 060436IN, NATO SEA SPARROW. AN/SAR-8 is a joint development with Industry, Science and Technology - Canada (the former Canadian Department of Industry, Trade and Commerce). There is no duplication of effort within the Navy or the Department of Defense.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM

(U) PROCUREMENT: NONE

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS:
- o This is the largest project under the Defense Development Sharing Agreement between U.S. and Canada.
- o Project agreement calls for prime contract cost sharing. (U.S. 67%, Canada 33%)
- o Project currently in FSED
- o FSED commenced Aug 84.

J. (U) TEST AND EVALUATION: Not Applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604609N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: BOMB AND FUZE IMPROVEMENT
PROJECT NUMBER: W1512 PROJECT TITLE: BOMB AND FUZE IMPROVEMENT

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W1512	ABF	13,353	15,202	24,533	27,532	Cont.	Cont.

B. (U) DESCRIPTION: This program responds to operational requirements which reflect the need to introduce major improvements to existing munitions and to develop new armaments to meet the Service's combat needs. FY 92 and FY 93 represent efforts essential to the development of Advanced Bomb Family.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. (U) Began risk reduction efforts.
   b. (U) Evaluated candidate insensitive explosives.
   c. (U) Established explosive fill development plan.

2. (U) FY 1991 Program:
   a. (U) Conduct Systems Requirements Review.
   b. (U) Milestone II Decision.
   c. (U) Release Request for Proposal (RFP) for Phase II of Full Scale Development contract.
   d. (U) Continue Phase I Full Scale Development.
   e. (U) Continue risk reduction efforts.
   f. (U) Demonstrate aeroshape of both the 500# and 1,000# class weapons.

3. (U) FY 1992 Plans:
   a. (U) Complete DT IIA.
   b. (U) Award contract for Single Integrating Contractor.
   c. (U) Commence Phase II Full Scale Development.
   d. (U) Conduct System Design Review.

4. (U) FY 1993 Plans:
   a. (U) Conduct Preliminary Design Review.
   b. (U) Commence DT IIB.
   c. (U) Conduct Safe Separation Testing on A-6 and F/A-18 Aircraft

5. (U) Program to Completion:
   a. (U) Conduct CDR (4Q94)
   b. (U) Complete TECHEVAL & OT IIA (2Q95).
   c. (U) Obtain MS IIIA approval for ABF (1Q96).

PROGRAM ELEMENT: 0604609N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: BOMB FUZE IMPROVEMENT
PROJECT NUMBER: W1512 PROJECT TITLE: BOMB FUZE IMPROVEMENT

d. (U) Award ABF LRIP Contract (2Q96).
e. (U) Complete ABF OPEVAL (OTIIB) (3Q96).
f. (U) Obtain MS IIIB approval for ABF (1Q97).
g. (U) Exercise Full Production Contract Option (2Q97).
h. (U) Exercise Contract Option for IAM Development (1Q94).
i. (U) Obtain MS IIIA approval for IAM (1Q98).
j. (U) Complete IAM OPEVAL (OTIIB) (2Q98).
k. (U) Obtain MS IIIB approval for IAM (1Q99).

D. WORK PERFORMED BY: IN-HOUSE: NWC, China Lake, CA; Sandia National Laboratory, Albuquerque, NM; Lawrence Livermore National Laboratory, DOE, Livermore, CA; PMTC, Pt. Mugu, CA. CONTRACTORS: TBD (COMPETITIVE CONTRACT).
Inertially Aided Munition (IAM). IN-HOUSE: NWC, China Lake, CA. CONTRACTORS; TBD (COMPETITIVE CONTRACT).

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
1. (U) Technology Changes: NONE
2. (U) Schedule Changes: IAM development delayed one year to reduce concurrency.
3. (U) Cost Changes: NONE.

F. (U) PROGRAM DOCUMENTATION:

TOR	- 5/87	AP	- 5/90
DOP	- 7/88	TEMP	- 1/91
OR	- 3/89		

G. (U) RELATED ACTIVITIES: NONE

H. (U) OTHER APPROPRIATION FUNDS: NONE

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE

J. (U) MILESTONE SCHEDULE:

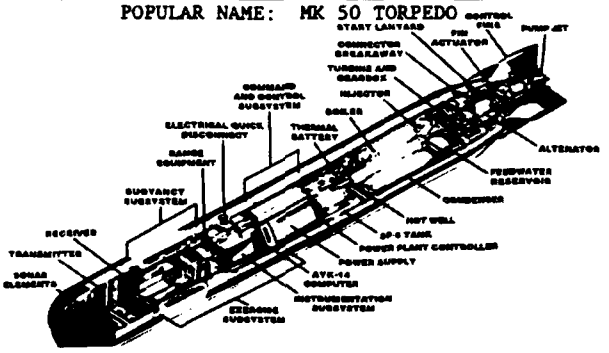
1. ABF Milestone II 2Q91
2. ABF Milestone IIIA 1Q96
3. ABF Milestone IIIB 1Q97

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604610N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: MK 50 Torpedo (Advanced Lightweight Torpedo)
PROJECT NUMBER: S0199 PROJECT TITLE: MK 50 Torpedo (Advanced Lightweight Torpedo)

POPULAR NAME: MK 50 TORPEDO

POPULAR NAME: MK 50 TORPEDO



A. ( ) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	To Complete
Program Milestones		MS IIIB 9/91			N/A
Engineering Milestones	Deliver final Drawings 4/91				N/A
T&E Milestones	TECHEVAL COMP 6/90	OPEVAL COMP CY 91			N/A
Contract Milestones	LRIP II Award 11/89 Honeywell 1/90 Westinghouse	LRIP III Award 1/91 1/91			N/A
BUDGET (SK)	FY 1990	FY 1991	FY 1992	FY 1993	Program Total
Major Contract	28,300	18,399	0	0	To Complete 907,010 0
Support Contract	156	108	105	0	15,992 0
In-House Support	29,799	19,683	1,857	0	535,024 0
GFE/ Other	435	590	40	0	11,861 0
TOTAL	58,690	38,780	2,002	0	1,469,887 0

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604610N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: MK 50 Torpedo (Advanced Lightweight Torpedo)
PROJECT NUMBER: S0199 PROJECT TITLE: MK 50 Torpedo (Advanced Lightweight Torpedo)

B. ( ) DESCRIPTION: This program element develops a new lightweight torpedo capable of countering the current and future Soviet submarine threat.

Improvements in Soviet submarine design and performance (speed, hull strength, maneuverability, depth, smaller active acoustic target size and lower radiated noise), tactics, and countermeasures capability.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. (U) Completed TECHEVAL in June 1990.
   b. (U) Deliver and proof final 200B Series torpedoes (43).
   c. (U) Started OPEVAL (158 test runs, plus data analysis) on 17 July 1990.
   d. (U) Awarded contracts to Honeywell and Westinghouse for the second Low Rate Initial Production contracts.
   e. (U) Conducted Physical Configuration Audit.

2. ( ) FY 1991 Program:
   a. (U) Complete OPEVAL.
   b. (U) Complete Milestone IIIB Decision.
   c. ( )
   d. (U) Complete LRIP I deliveries (both contractors).
   e. (U) Initial deliveries of LRIP II torpedoes from both contractors.
   f. (U) Receive final Level III drawing package.
   g. (U) Complete second source qualification.

3. (U) FY 1992 Plans:
   a. (U) Complete tactical software, test equipment, and engineering design upgrades resulting from OPEVAL.
   b. (U) Complete logistic upgrades resulting from OPEVAL.

4. (U) FY 1993 Plans: N/A

5. (U) Program to completion: N/A

PROGRAM ELEMENT: 0604610N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: MK 50 Torpedo (Advanced Lightweight Torpedo)
PROJECT NUMBER: S0199 PROJECT TITLE: MK 50 Torpedo (Advanced Lightweight Torpedo)

D. (U) WORK PERFORMED BY: In-house: NOSC, San Diego, CA (technical direction agent and lead laboratory); NSWC, White Oak, MD (warhead and exploder); NUWES, Keyport, WA and NCSC, Panama City, FL. Contractors: ARL, Penn State University, State College, PA; APL, University of Washington, Seattle, WA; ARL, University of Texas, Austin, TX; Honeywell Inc., Hopkins, MN (prime torpedo contractor); Honeywell Inc., Seattle, WA (subcontractor); Allied-Signal, Fluid Systems Division, Tempe, AZ (subcontractor).

E. (U) COMPARISON WITH REVISED FY 1991 PRESIDENT'S BUDGET
1. (U) Technical changes: None.
2. (U) Schedule changes: MS IIIB and IOC delayed due to slip in planned completion of OPEVAL.
3. (U) Cost changes: None.

F. (U) PROGRAM DOCUMENTATION:

JMSNS/RD	9/80
SDDM (M/S II)	3/84
DCP-173	7/84
DT-1 Report	6/85
DT-IIA Report	5/86
ILSP 133-3 FSD (Rev 2)	6/86
ILSP Production	6/88
TEMP 225 (Rev 7)	7/90
DCP-173	1/89
OT-IIA Report	3/89
ADM (M/S IIIA)	5/89

G. (U) RELATED ACTIVITIES: PE 0603610N (Advanced Warhead Development); PE 0603562N (Submarine Tactical Warfare Systems (Advanced)); PE 0602314N (Antisubmarine Warfare Technology).

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT						
MK 50 Torp WPN #44, #45	270,790	327,802	261,663	270,891	5,241,924	6,744,736
Initial Spares	3,200	5,176	12,207	15,632	Continuing effort	
(U) MILCON	0	0	10,800	0	16,400	39,500

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: This information is contained in the FY 1992 Congressional Data Sheet.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604612M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Mine/Countermine Systems (Engineering)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C0080	Mine/Booby Trap	0	0	49	449	98	CONT.
C1969	Mine Neutralization Equipment	4,026	3,066	1,134	2,463	1,597	CONT.
C1970	Surf Zone Mine Clearing	23,262	0	0	0	0	38,656
	TOTAL	27,288	3,066	1,183	2,912	1,695	CONT.

B. (U) DESCRIPTION: This program element covers a wide variety of present and emerging technologies which are projected to contribute to the Marine Corps Mine/Countermine system capability. Largely focused on countermine efforts, this program element will specifically develop systems which will detect or neutralize mines. The dynamic nature and complexity of the countermine problem and its relative urgency necessitates that we consider the advanced development of a variety of systems which will each contribute to achieving overall countermine effectiveness.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604612M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Mine/Countermine Systems (Engineering)
PROJECT NUMBER: C0080 PROJECT TITLE: Mine/Booby Trap Engineering

C. (U) DESCRIPTION: This project develops systems to be used for breaching, proofing and marking lanes through minefields during amphibious and inland operations for the Marine Corps. Currently the Marine Corps has no effective countermeasure against magnetically influenced mines, which are becoming a larger portion of the threat. The Magnetic Countermine System (MACS) will provide an electromagnetic signal causing magnetically influenced mines to prematurely detonate.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: NONE.

2. (U) FY 1991 Program: First year of Foreign Weapons Evaluation (FWE) of Israeli Anti-Magnetic Mine Actuating Device (AMMAD) system.

3. (U) FY 1992 Plans: Complete FWE of AMMAD system. Prepare and publish requests for proposal (RFP) for Flexible Electromagnetic Coil systems.

4. (U) FY 1993 Plans:

a. (U) Full scale engineering development (FSED) contractor will produce Flexible Electromagnetic Coil systems.

b. (U) Assess application of AMMAD to Amphibious Assault Vehicle (AAV) mounted mine plow.

5. (U) Program to Completion: This is a continuous program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MCRDAC, Quantico, VA; NWSC, Crane, IN. CONTRACTORS: TBD.

F. (U) RELATED ACTIVITIES: NONE.

G. (U) OTHER APPROPRIATION FUNDS: NONE.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: FWE to be conducted in accordance with Department of Defense Order 5000.3-M-2.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604612M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Mine/Countermine Systems (Engineering)
PROJECT NUMBER: C1969 PROJECT TITLE: Mine Neutralization Equipment

C. (U) DESCRIPTION: This program will test and evaluate existing mine neutralization systems for both individuals and vehicles, and will provide for the engineering development of new technology for mine neutralization applications. Specifically, the Anti-Personnel Obstacle Breaching System (APOBS) is being developed and tested to replace the World War II vintage Bangalore Torpedo. An Assault Amphibious Vehicle (AAV) mounted Track Width Mine Plow (TWMP) is being developed to provide minefield proofing for amphibious assaults from the highwater mark inland and where tanks are not employed.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Fabricated APOBS systems for Developmental and Operational Testing (DT/OT). Initiation of DT for APOBS. Constructed two Full Scale Engineering Development (FSED) AAV TWMP. Conducted contractor performance/reliability tests on FSED plows.

2. (U) FY 1991 Program: Complete APOBS DT testing. Obtain Weapons System Explosives Safety Review Board (WSESRB) and Milestone II-P decisions. Conduct DT for AAV mounted TWMP.

3. (U) FY 1992 Plans: Conduct OT for APOBS. Complete level III drawings and specifications for APOBS. Obtain Milestone II decision on AAV mounted TWMP. Conduct OT, environmental and destructive blast analysis of plows.

4. (U) FY 1993 Plans: Obtain final WSESRB and Milestone III approval for APOBS. Technical Data Package (TDP) upgrade and review test evaluations of AAV mounted TWMP. Obtain Milestone III decision.

5. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MCRDAC, Quantico, VA; NCSC, Panama City, FL; NWSC, Crane, IN; NOS, Indian Head, MD; White Oak Laboratory, MD; TECOM, Aberdeen, MD; MCOTEA, Quantico VA. CONTRACTORS: NONE.

F. (U) RELATED ACTIVITIES: NONE.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT						
APOBS	0	0	0	0	19,736	19,736
MINE PLOW	0	0	0	0	1,800	1,800

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604612M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Mine/Countermine Systems (Engineering)
PROJECT NUMBER: C1970 PROJECT TITLE: Surf Zone Mine Clearing (CATFAE)

PICTURE NOT AVAILABLE

POPULAR NAME: CATFAE

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993
Program Milestones				
Engineering Milestones	SYSTEM PDR 3RD QTR ROUND PDR 4TH QTR	SYSTEM CDR 2ND QTR ROUND CDR 3RD QTR		
T&E Milestones				
Contract Milestones	SYSTEM AWARD 1ST QTR			

Budget (K)	FY 1990	FY 1991	FY 1992	FY 1993	Program Total
Major (ROUND)	9,800	0			
Contract (SYSTEM)	8,500	0			
Support Contract	400	0			
In-House Support	4,516	15,394			
GFE/ Other	46	0			
TOTAL	23,262	15,394	0	0	38,656

B. (U) DESCRIPTION: This project will provide a shoot-on-the-move capability to clear lanes through mine obstacles in the surf zone and beyond the high water mark. It will utilize emerging fuel-air explosive technology with multiple detonation. The system is rack mounted with a slide-in and slide-out capability for use in the Assault Amphibian Vehicle.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604654N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Joint Service Explosive Ordnance Disposal Dev (Eng)
PROJECT NUMBER: S1829 PROJECT TITLE: Explosive Ordnance Disposal Procedures

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1829	Explosive Ordnance Disposal Procedures	5,073	6,051	5,679	6,193	CONT.	CONT.

B. ( ) DESCRIPTION: This is a Joint Service Program. DOD assigned development responsibility for Explosive Ordnance Disposal procedures and equipment to the Navy in support of the Joint Services. This program develops the Explosive Ordnance Disposal techniques required for all known domestic and foreign conventional and nuclear ordnance, and Improvised Nuclear Devices. It also

C. ( ) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. ( ) FY 1990 Accomplishments:

a. (U) Developed approximately 140 new procedures and provided approximately 450 technical updates of existing procedures.

b. (

c. ( )

2. (U) FY 1991 Program:

a. (U) Procure and develop procedures for new, sophisticated threat weapons.

b. ( ) Develop

c. (U) Continue on-going procedure development.

3. (U) FY 1992 Plans:

a. (U) Develop disablement procedures for additional threat weapons and provide technical updates to existing procedures.

b. ( ) Develop additional

4. (U) FY 1993 Plans: Continue on-going programs.

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: Naval EODTC, Indian Head, MD. CONTRACTORS: EG&G, Las Vegas, NV.

E. (U) RELATED ACTIVITIES: All conventional or nuclear ordnance related developments, both domestic and foreign, manufactured or improvised.

F. (U) OTHER APPROPRIATION FUNDS: Not applicable.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604656M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Assault Vehicles (Engineering)
PROJECT NUMBER: C2031 Light Armored Vehicle 105

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C2031	LAV-105	19,980	18,374	19,104	9,965	2,133	CONT.

B. (U) DESCRIPTION: The LAV-105 will enhance the Light Armored Infantry Battalion (LAI BN) capability to conduct reconnaissance, security, and economy of force operations. With its heavy caliber 105mm main gun, LAV 105 provides accurate fire against light armor, fortified positions, and personnel. LAV-105 provides enhanced capabilities to the LAV 25 and LAV-AT through the intergration of a fully stabilized turret, M1A1-type fire control, thermal day sight, autoloader, and laser range finder. Combining light weight components with an accurate heavy caliber weapon will provide the LAI BN a potent addition.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS: Conducted Full Scale Development (FSD) wherein two contractors competed during Developmen/Operational testing and submit production proposals. A source selection process determined the production contractor.

1. (U) FY 1990 Accomplishments: Formal Source Selection. One contractor selected June 1990 to build three prototypes for FSD.

2. (U) FY 1991 Program: Continue the fabrication of the LAV-105 prototypes. Complete DT and OT planning.

3. (U) FY 1992 Plans: Deliver prototype vehicles. Commence DT II.

4. (U) FY 1993 Plans: Complete DT II. Refurbish prototypes. Conduct OT II. Conduct Physical Tear-down Maintenance Evaluation (PTME).

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: MCRDAC and MCCDC, Quantico, VA; MCLB, Albany, GA; US Army TACOM, Warren, MI; NSWC, Dahlgren, VA; Watervliet Arsenal/Benet Labs, Watervliet, NY. CONTRACTORS: MKI, Inc., Springfield, VA; Cadillac Guage Diesel Division of General Motors, London, Ontario, Canada.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604656M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Assault Vehicles (Engineering)
PROJECT NUMBER: C2031 Light Armored Vehicle 105

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: N/A

2. (U) SCHEDULE CHANGES: Due to $4.0 million Congressional reduction in FY 1991, a year will be added to the FSD phase.

3. (U) COST CHANGES: The $4.0 million Congressional decrement in FY 1991 resulted in an approximate increase of $1.7 million to the FSD phase.

F. (U) PROGRAM DOCUMENTATION:

A. ROC	Dec 1980
B. TEMP	Jul 1989
C. ADM (MICPOM IIB)	Jul 1989

G. (U) RELATED ACTIVITIES: U.S. Army Gun System (AGS).

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT						
LAV-105	0	0	0	15,000	542,523	557,523

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Saudi Arabian Army National Guard (SANG) has expressed a desire for the LAV-105 (Qty 130) with their existing FMS case.

J. (U) MILESTONE SCHEDULE:

A. MCPDM IIA	Dec 1988
B. MCPDM IIB	Jul 1989
C. FSD Contract Award	Jun 1990
D. Funding IPR (long lead material)	Jan 1992
E. Prototype Delivery	May 1992
F. DT II	May 1992-Jan 1993
G. Funding IPR	Jan 1993
H. Refurbishment	Feb-Apr 1993
I. OT	May-Jul 1993
J. PTME	Aug-Sep 1993
K. MCPDM III	Jan 1994
L. Production Contract Award	Jan 1994
M. First Vehicle Delivery	Jul 1995

FY 1992/3 NAVY DESCRIPTIVE SUMMARY

Program Element: 0604703N Budget Activity: 6
Program Element Title: Personnel, Training, Simulation & Human Factors
Project Number: R1882 **Project Title:** Personnel, Training, Simulation & Human Factors

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY1990 ACTUAL	FY1991 ESTIMATE	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R1882	PERS,TNG, SIM, & HF	990	1,065	1,794	2,975	Cont	Cont

B. (U) DESCRIPTION: This program applies advanced technologies to operational requirements in manpower, personnel, training, and human factors. It focuses on adaptive testing, math optimization, statistical/econometric forecasting, computer-based simulation, and decision support systems. This effort will improve the alignment of personnel inventory with authorizations, contributing to personnel readiness.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS: Initiated score equating verification for Computerized Adaptive Test (CAT)-Armed Services Vocational Aptitude Battery (ASVAB). Developed sea/shore rotation policy analysis model.
2. (U) FY 1991 PROGRAM: Analyze CAT-ASVAB score equating verification data. Test/implement sea/shore rotation system.
3. (U) FY 1992 PLANS: Validate methods to determine required enlisted personnel quality mix. Exploit market research methods to develop alternative recruiting incentives to attract high quality recruits.
4. (U) FY 1993 PLANS: Develop enlisted cost/performance trade-off model.
5. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVPERSRANDCEN, San Diego, CA. CONTRACTORS: B-K Dynamics, Rockville, MD; Advanced Technology, Inc., Reston, VA; Resource Consultants, Inc. (RCI), Falls Church, VA.

E. (U) RELATED ACTIVITIES: 0602722A, Personnel and Training; 0602703F, Personnel Utilization Technology; 0603731A, Manpower and Personnel; 0603707N, Manpower and Personnel Systems; 0603632M, Marine Corps Advanced Manpower Training Systems; and 0603704F, Manpower and Personnel Systems Technology.

F. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604704N BUDGET ACTIVITY: 4-Tactical Programs
PROGRAM ELEMENT TITLE: ASW Oceanographic Equipment
PROJECT NUMBER: R1740 PROJECT TITLE: ASW Ocean Survey Systems

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R1740	ASW Oceanographic Survey Systems	1,218	964	1,260	1,233	Continuing	Continuing

B. (U) DESCRIPTION: This program provides engineering development of survey sensor technologies developed in response to Fleet needs for oceanographic data to support environmental, acoustic and non-acoustic anti-submarine warfare measurements and systems.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:
   a. (U) Initiated fleet version of tail A-size 3 month buoys under Joint U.S./Canadian Defense Development Sharing Program (DDSP).
   b. (U) Conducted Arctic Airborne Electro-Magnetic (AEM) Ice Thickness Measurement System test and evaluation in Arctic local testing.
   c. (U) Completed Expendable Conductivity Temperature Depth (XCTD) development, transition to NAVOCEANO.
2. (U) FY 1991 PROGRAM:
   a. (U) Sign DDSP for A-size, 3 month mini drifting data buoys (MDDB).
   a. (U) Start 300 m TZ tail and ambient noise sensor (ANS) for MDDB.
   b. (U) Continue development of sensor for ice penetration package.
   c. (U) Arctic Test and Evaluation of Ice Measurement System for Naval Polar Oceanography Center (NPOC).
3. (U) FY 1992 PLANS:
   a. (U) Complete wind speed/direction sensors on drifting buoys.
   b. (U) Transition ANS, 300 meter tail mini-drifter to NAVAIR.
   c. (U) Initiate added sensors to ice penetration package.
4. (U) FY 1993 PLANS:
   a. (U) Initiate 6.4 development of Tactical Oceanographic Monitoring System (TOMS) from 6.3 program.
   b. (U) Initiate 600 meter MDDB, transition MET version to NAVAIR.
   c. (U) Initiate 6.4 development of expendable optical probe.
5. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: None. CONTRACTORS: Sparton of Canada, London, Ont., Canada; USA, COE, CRREL, Hanover, NH; METOCEAN Data Systems, Ltd., Dartmouth, Nova Scotia, Canada.

E. (U) RELATED ACTIVITIES: PE 0603704N, ASW Oceanography.
F. (U) OTHER APPROPRIATION FUNDS: Not applicable.
G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: $1.75M U.S./Canadian Defense Development Sharing Program (DDSP) agreement for joint development of ice penetrator package for air deployed sensors signed July 90 with 50 % cost sharing by Canada.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604707N BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: THEATER MISSION PLAN CTR

PROJECT NUMBER: X0798 PROJECT TITLE: OVER-THE-HORIZON TARGETING

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROG
X0798	Over-the-Horizon Targeting	3,545	4,119	2,974	2,984	Cont.	Cont.

B. (U) DESCRIPTION: The OTH-T program performs critical review and test of C3I systems supporting use of extended range weapons including TACAIR and TOMAHAWK/HARPOON cruise missiles. As the applied agent of the Navy's Warfare Systems Architect & Engineer (WSA&E), the OTH-T Program evaluates use of existing & programmed sensor data, weapons control & C3I support. It assesses deficiencies in interoperability, thereby providing concept definition for improvements to the Navy's Command & Control Systems (NCCS). The OTH-T Program conducts OUTLAW-series targeting experiments and major system tests under CNO Operational Test Project K-310. Additionally, it provides configuration control for NAVY OTH-T systems.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:

a. (U) Developed methodology for OTH-T "Information Management" and integrated OTH-T systems with related warfare architectures.

b. (U) Developed and executed OTH-T System-Level Configuration Specifications.

c. (U) Developed & deployed P-3 OTH-T Airborne Sensor Interface System (OUTLAW HUNTER).

d. (U) Initiated DOD Joint OTH-T T&E Program.

2. (U) FY 1991 PROGRAM:

a. (U) Provide on-site Fleet OTH-T sys. eng. sup. including systems grooms, exercise development, and analysis

b. (U) Conduct OTH-T platform & system improvement demos.

c. (U) Validate specific sensor-to-shooter targeting data delivery paths within the OTH-T architecture.

d. (U) Provide technical assistance to OTH-T member systems for integration and interoperability testing.

e. (U) Develop S-3B (OUTLAW VIKING), develop/deploy improved P-3 OTH-T Airborne Sensor Interface System (OASIS) and conduct feasibility study of E-2 (OUTLAW HAWKEYE) & EP-3.

3. (U) FY 1992 PLANS:

a. (U) Provide on-site Fleet OTH-T sys. eng. sup. including system grooms, exercise development, and analysis

b. (U) Conduct OTH-T platform & system improvement demos.

c. (U) Validate specific sensor-to-shooter targeting data delivery paths within the OTH-T architecture.

d. (U) Provide technical assistance to OTH-T member systems for integration and interoperability testing.

e. (U) Develop a software program (OUTLAW HAWKEYE) for use in the E-2 aircraft and deploy the software (OUTLAW VIKING) on the S-3B aircraft.

4. (U) FY 1993 PLANS:

a. (U) Provide system engineering analysis including system grooms, exercise development and analysis.

b. (U) Conduct OTH-T platform and system improvement demos.

c. (U) Validate specific sensor-to-shooter targeting data delivery paths within the OTH-T architecture.

d. (U) Provide technical assistance to OTH-T member systems for integration and interoperability testing.

e. (U) Deploy E-2 (OUTLAW HAWKEYE).

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

PROGRAM ELEMENT: 0604707N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: THEATER MISSION PLAN CTR
PROJECT NUMBER: X0798 PROJECT TITLE: OVER-THE-HORIZON TARGETING
D. (U) WORK PERFORMED BY: IN-HOUSE: NOSC, San Diego, CA, and Kaneohe, HI; NRL, Washington, DC; CONTRACTORS: JHU/APL, Laurel, MD; TIBURON Systems, San Jose, CA.
E. (U) RELATED ACTIVITIES: Program Element 0603763N, WSA&E; Program Element 0604367N, Tomahawk Missile System.
F. (U) OTHER APPROPRIATION FUNDS: None. This is a non-acquisition program.
G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604710N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: NAVY ENERGY PROGRAM (ENG)
PROJECT NUMBER: R0371 **PROJECT TITLE:** Energy Conservation (ENG)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0371	ENERGY CONSERVATION (ENG)	2,801	3,426	3,389	3,592	Cont.	Cont.

B. (U) DESCRIPTION: Develop energy-efficient systems and practices for ships, facilities, and aircraft. Resulting energy efficiency gains contribute to fleet sustainability, combat capability (e.g., greater range, time on station), and reduced costs. Major efforts include fuel use optimization aids for aircraft; antifouling paints, air conditioning systems and lighting for ships; and cogeneration systems for facilities. This program element provides test and evaluation needed to prepare technology identified/developed under the companion PE 0603724N Proj R0829 for fleet use. Through 1985, the combined 6.3/6.4 Navy Energy Conserv Program had produced energy cost savings estimated at $127M per yr (compared to 1975 fuel consumption rates). (As currently funded annual savings of $130M by 1995 and $200M by 2000 are projected compared to 1985 cost.)

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: T&E of new ablative copper paints continued in search of alternative to organotin. Energy eff AC fluorescent lighting was approved for use on DDG-51 and SSN-21; the air conditioner plant for DDG-51 Flight II completed preproduction testing. Aircraft Performance Advisory Computer (APAC), a hand-held fuel use optimization system (FUOS), is now operational on all P-3s and some KC-130. Flight Optimization Routines for Energy Management (FOREM) a pre- flight planning FUOS was delivered to F/A-18's. Installed Closed Loop Environmental Control System on P-3 for flight tests. Published steam trap selection guide.

2. (U) FY 1991 Program: Develop DC fluorescent lighting for use on future ships. T&E ablative copper paints/expand qualified products list. Make APAC and FOREM available to more aircraft (i.e., F-14, A-6E, TA-4J, A-7E). Publish testing standards for photovoltaic power units.

3. (U) FY 1992 Plans: T&E Military specifications (MILSPEC) compressor (nonfreon) air conditioning plant for DDG-51 Flt III. Continue DC lighting and paint programs; Aircraft Performance Advisory Computer (APAC) & Flight Optimization Routines for Energy Management (FOREM) programs. T&E nonfreon refrigerants for shore based air conditioners/heat pumps.

4. (U) FY 1993 Plans: Complete DC lighting DT&E. Continue development of ablative copper anti-fouling paint DT&E. Complete F/A-18 flight advisory to flight management system upgrade. Cont APAC & FOREM. Publish high efficiency electric motor selection criteria.

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: DTRC, Annapolis, MD; NADC, Warminster, PA; NCEL, Port Hueneme, CA; NWC, China Lake, CA. CONTRACTORS: York Intl., York, PA; IOTA Eng., Tucson, AZ; McDonnell Douglas, St. Louis, MO.
E. (U) RELATED ACTIVITIES: Program Element 0603724N, Navy Energy Program (Adv).
F. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.
G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: N/A

FY 1992 RDT&E, NAVY DESCRIPTIVE SUMMARY

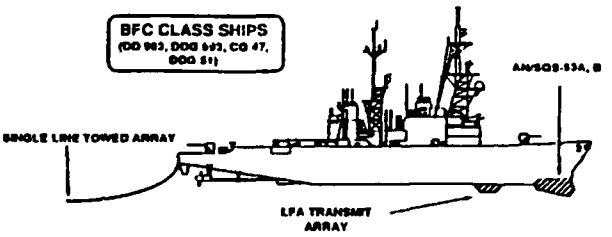
PROGRAM ELEMENT: 0604713N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface ASW Systems Improvement
PROJECT NUMBER: S1916 PROJECT TITLE: AN/SQY-1

( ) System Summary

Architecture: Fully integrated and expandable
Electronic space and weight: Less than AN/SQQ-89

Integrated torpedo detection

All sensor contact correlation and data fusion
OBT: Full fidelity
Manning: No increase



POPULAR NAME: AN/SQY-1

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	TO COMPLETE
Program Milestones	None	MSII 6/91	NAE Prog Rev 7/92	None	MSIII 4Q/98
Engineering Milestones	Design Def 6/90	None	PDR Sys 4/92 Hdwr 12/92	PDR SW #1 10/93 CDR Sys & Hdwr 6/93	Del EDM 3Q/97
T&E Milestones	GLOVER PH3 2/90	GLOVER 11/90 PH4 3/91 PH5	GLOVER PH6 10/91	Risk Reduction 9/93	TECHEVAL/ OPEVAL Complete 4Q/98
Contract Milestones	None	FSED 6/91	None	None	1st Prod Option 2Q/99

FY 1992 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604713N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Surface ASW Systems Improvement
PROJECT NUMBER: S1916 **PROJECT TITLE:** AN/SQY-1

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands) (cont'd)

BUDGET ($K)	FY 1990	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL TO COMPLETE
Major Contract	10,193	38,980	68,000	194,900	Continuing Program
Support Contract	3,500	3,600	6,000	8,600	Continuing Program
In-House Support	32,600	21,807	28,324	42,859	Continuing Program
GFE/ Other	32,000	42,000	19,400	51,269	Continuing Program
TOTAL	78,293	106,387	121,724	297,628	Continuing Program

[a] Funds in ( ) are programmed to upgrade the SQQ-89(V) ASWCS using new generation Navy standards and are not a part of the AN/SQY-1 Program.

B. (U) DESCRIPTION: AN/SQY-1, formerly referred to as AN/SQQ-89 Improved, is a major upgrade to the AN/SQQ-89(V) Surface ASW Combat System required to maintain currency with significant improvements in the Soviet submarine threat of the 1990s and 2000s.

(U) The EMSP program objective is to upgrade the AN/SQQ-89(V) Anti-Submarine Warfare Combat System (ASWCS) using new generation Navy standards to keep the system current with the latest technology. This effort will require design, development, testing and documentation updates to reflect system software integration activities.

PROGRAM ELEMENT: 0604713N **BUDGET ACTIVITY: 4**
PROGRAM ELEMENT TITLE: Surface ASW Systems Improvement
PROJECT NUMBER: S1916 **PROJECT TITLE: AN/SQY-1**

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. ( ) FY 1990 Accomplishments: (Partly funded under PE 0603553N)

a. ( ) Performed Phase III tests aboard USNS GLOVER using bow mounted

Prime objective was to demonstrate the ability to meet the AN/SQY-1 extended range ctive performance specified in OR 062-03-86.

b. (U) Completed the competitive Design Definition phase and selected FSED contractor.

2. (U) FY 1991 Program:

a. (U) Conduct Milestone II Defense Acquisition Board (DAB) review. Decision to be considered is to proceed into Full Scale Engineering Development (FSED) with the selected prime contractor team for development of ship systems.

b. (U) Continue with Phases 4 and 5 (PH4 & 5) USNS GLOVER sea tests in bottom limited ocean areas and other risk reduction tests.

c. (U) Start procurement of long lead Navy standard equipment to support FSED.

3. (U) FY 1992 Plans:

a. (U) Conduct Navy Acquisition Execuive (NAE) Program Review.

b. (U) Conduct Phase 6 (PH6) USNS GLOVER sea tests in shallow water.

c. (U) Complete system and hardware Preliminary Design Reviews (PDRs).

d. (U) Continue risk reduction program.

4. (U) FY 1993 Plans:

a. (U) Continue procurement of long lead Government Furnished Equipment (GFE) to support FSED.

b. (U) Complete software build No. 1 PDR.

c. (U) Complete system and hardware Critical Design Reviews (CDRs).

d. (U) Complete risk reduction program.

5. (U) Program To Completion:

a. (U) Deliver Engineering Development Model (EDM) system for Technical/Operational Evaluation (TECH/OPEVAL) (3rd Qtr, FY97).

b. (U) Complete TECH/OPEVAL (3rd Qtr, FY98) and MS III (4th Qtr FY98).

c. (U) Award 1st production option (2nd Qtr, FY99).

d. (U) Start production deliveries in 4th Quarter FY2001.

D. (U) WORK PERFORMED BY: In-house: NUSC, New London, CT; NOSC, San Diego, CA; Naval Surface Warfare Center, Silver Spring, MD; David Taylor Naval Ship R&D Center, Bethesda, MD; FCDSSA, Dam Neck VA; NWSC, Crane, IN; NSCSES, Norfolk, VA; NTSC, Orlando, FL; OPTEVFOR, Norfolk, VA; MSC, Washington DC; NSMRL, New London, CT. Contractors: AT&T Inc., Greensboro, NC; Westinghouse Electric Corporation, Baltimore, Sykesville, Annapolis, MD, College Station, TX, Santa Isabela, PR; Honeywell Inc., Everett, WA; Librascope Corp., Glendale, CA; Norden Systems, Mellville, NY.

PROGRAM ELEMENT: 0604713N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface ASW Systems Improvement
PROJECT NUMBER: S1916 PROJECT TITLE: AN/SQY-1

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
1. (U) Technical changes: None.

2. (U) Schedule changes: Schedule changes to Milestone II from January 1990 to April 1991 have been the result of delayed overhaul completion which delayed planned USNS GLOVER sea tests required to support Milestone II decision, FY90 Major Warship Review, and SECNAV and OSD program redirections further delayed Milestone II to June 1991.

3. (U) Cost changes: The FY91 funding has been reduced by $16.2M since the FY91 President's budget. This was in part a result of a $15.0M reduction by the Joint Appropriation Committee due to delay of contract award and their belief that there was a funding excess in the FY90 funds being carried over for award of the FSED contract.

F. (U) PROGRAM DOCUMENTATION:

TOR	02/85
DOP	11/85
OR	12/85
DCP	In Review
TEMP	In Review

G. (U) RELATED ACTIVITIES:
1. (U) PE 0604524N/S1941 (Submarine Combat Systems).

2. (U) PE 0604507N (Enhanced Modular Signal Processor) and PE 0604574N (Navy Standard Display Systems).

3. (U) PE 0604575N/S1451 (AN/SQS-53C).

4. (U) PE 0603553N (Surface Antisubmarine Warfare).

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.
(U) PROCUREMENT: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION DATA: Not applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604714N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AIR WARFARE TRAINING DEVELOPMENT
PROJECT NUMBER: W2124 PROJECT TITLE: Universal Threat System for Simulators(UTSS)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W2124	UTSS	-0-	-0-	832	2,209	4,234	7,275

B. (U) DESCRIPTION: UTSS is designed to provide current threat simulation to a wide range of aircrew simulators in three services, using a common threat module and standard threat database. Historically, each different simulator has required development and maintenance of a separate threat generation system. Development of the standardized UTSS will provide more current threat representation and will eliminate redundant efforts and expense. UTSS will be incorporated on existing and future Navy aircrew Flight Trainers, Tactics Trainers and Weapons System Trainers. A Front End Analysis (FEA) has been funded by the Air Force. UTSS is a Navy-led, tri-service program through the Joint Technical Coordination Group - Training Systems Development (JTCG-TSD).

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Not Applicable.
2. (U) FY 1991 Program: Not Applicable.
3. (U) FY 1992 Plans: Issue Request for Proposal (RFP). Award contracts for prototypes.
4. (U) FY 1993 Plans: Build and test prototype UTSS module and database.
5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRDEVCEN, Warminster, PA, NAVTRASYSCEN, Orlando, FL, AFHRL WILLIAMS AFB AZ, FTD WRIGHT PATTERSON AFB OH, and OL YW ASD WRIGHT PATTERSON AFB OH. CONTRACTORS: ISI, Inc, Arlington, VA.

E. (U) RELATED ACTIVITIES: UTSS is a tri-service program.

F. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT						
APN-7 (COMMON GRND EQUIP-TRNG EQUIP)	-0-	-0-	-0-	-0-	15,000	15,000
(U) MILCON						
N/A						

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: N/A.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604715N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Surface Warfare Training Devices

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1140	Tactical Advanced Combat Direction Electronic Warfare Mod	955	-0-	-0-	-0-	-0-	16,194
S1427	Surface Tactical Team Trainer	7,070	10,970	10,711	-0-	-0-	63,818
S1834	Landing Craft Air Cushion (LCAC) Operator Trainer	8,885	1,327	-0-	-0-	-0-	28,725
	TOTAL	16,910	12,297	10,711	-0-	-0-	108,737

B. (U) DESCRIPTION: This program supports the mission of the Deputy Chief of Naval Operations Surface Warfare Sponsor by improving readiness and training. It addresses requirements of the Fleet and Chief of Naval Education and Training for development of prototype surface warfare training devices to improve training, operational readiness, efficiency and safety, and to reduce training time and costs.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604715N **BUDGET ACTIVITY: 4**
PROGRAM ELEMENT TITLE: Surface Warfare Training Devices
PROJECT NUMBER: S1427 **PROJECT TITLE: Surface Tactical Team Trainer**

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1427	Surface Tactical Team Trainer	7,070	10,970	10,711	-0-	-0-	63,818

B. (U) DESCRIPTION: This project will develop a generic training system to replace obsolete devices, and provide team procedural and tactical training/evaluation in a multi-threat environment for conventional and tactical data equipped ships. These devices will have a direct impact on the Navy's ability to train for battle. The 20A66 ASW Tactical Team Trainer will replace the ASW Coordinated Tactics Trainers (X14A6 and 14A6) built in the 1960s, and provide multiple platform/multi-threat procedural, tactical and decision-making training for single units up to battle group size. Each Trainer will be composed of multiple surface ship, submarine, and aircraft "command centers" configured with multi-purpose equipment which will simulate the sensor, weapon and communication capabilities of the platforms represented, and train up to 300 people in coordinated ASW Battle Group operations.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:
   a. (U) Completed hardware design
   b. (U) Commenced 20A66 development and procurement of preliminary Lot I hardware for FLEASWTRACENPAC, San Diego.
2. (U) FY 1991 PROGRAM:
   a. (U) Continue 20A66 Lot I development with emphasis on software development and initial hardware interfacing.
   b. (U) Complete Device 20A66 Critical Design Review in December 1990.
3. (U) FY 1992 PLANS:
   a. (U) Continue Hardware/Software integration and begin system testing inplant.
4. (U) FY 1993 PLANS: N/A

PROGRAM ELEMENT: 0604715N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface Warfare Training Devices
PROJECT NUMBER: S1427 PROJECT TITLE: Surface Tactical Team Trainer

5. (U) PROGRAM TO COMPLETION: R&D Program completes.

D. (U) WORK PERFORMED BY: IN-HOUSE: Naval Training Systems Center, Orlando, Fla.
Contractor: Hughes, Long Beach, Ca.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: NONE

2. (U) SCHEDULE CHANGES: NONE

3. (U) COST CHANGES: NONE

F. (U) PROGRAM DOCUMENTATION:

OR	JUN 81
TDRD (REV)	DEC 86
TETAP	NOV 85
TETAP (REV 2)	FEB 87
AP (REV 1)	JUN 87

G. (U) RELATED ACTIVITIES: Not Applicable.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 Actual	FY 1991 Estimate	FY 1992 Estimate	FY 1993 Estimate	TO Complete	TOTAL Program
(U) PROCUREMENT (OPN, BA-7)/#265	-0-	-0-	-0-	9,594	10,976	20,570

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE:

(U) Preliminary Design Review	Jun 90
(U) Critical Design Review	Dec 90
(U) Installation/Testing	Dec 92

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604717M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Combat Services Support (Engineering)
PROJECT NUMBER: C0079 PROJECT TITLE: Combat Logistics Support (CBT LOG SPT)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY1991 ESTIMATE	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C0079	CBT LOG SPT	457	1,663	107	229	CONT.	CONT.
C1966	Surf Zone Container Handling	0	1,179	0	0	0	3,621
C1983	Tactical Fuel Systems	0	691	0	0	0	691
	TOTAL:	457	3,533	107	229	CONT.	CONT.

B. (U) DESCRIPTION: This program element provides modernization of engineering tool sets, chests and kits, engineering equipment, tactical fuel system equipment, utilities equipment, computer-aided construction planning, estimating, and management. The program also improves/develops tactical clothing/equipment and fields medical equipment.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604717M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Combat Services Support (Engineering)
PROJECT NUMBER: C0079 PROJECT TITLE: Combat Logistics Support (CBT LOG SPT)

C. (U) DESCRIPTION: This program provides modernization of engineering sets, chests and kits, engineering equipment, and computer-aided construction planning, estimating, and management. The program also improves/develops tactical clothing/equipment and fields medical equipment.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Began expeditionary water distribution systems development. Began development on the light weight generator set. Initiated concept validation of a mechanical sandbag filler. Completed Request for proposal for Manual X-Ray Processor. Initiated streamlined acquisition of X-Ray Darkroom and X-Ray Machine. Developed, tested and improved wire cage propeller guard, combat boot and sock, individual shelter, over-snow mobility systems and high mobility multi-purpose wheeled vehicle (HMMWV) command shelters. Completed tactical shelters for fielding.

2. (U) FY 1991 Program: Contract and field Manual X-Ray Processor. Concluded development on the light weight generator set candidates. Begin testing on the individual minefield protective gear. Procure test quantities of the combat glove. Initiated concept validation of clearance blade for the AAV.

3. (U) FY 1992 Plans: Select, test and field Marine Corps Field X-Ray Darkroom and X-Ray Machine. Complete testing on many cold weather items. Conduct testing of clearance blade on the AAV.

4. (U) FY 1993 Plans: Test/evaluate Clinical Laboratory, Medical Repair, and Dental X-Ray equipment and Medical Shelters. Develop the multipurpose helmet.

5. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MCRDAC, Washington, DC; NMRDC, Bethesda, MD; NCEL, Port Hueneme, CA; Natick RD&E Center, Natick, MA; Human Engineering Lab, Aberdeen, MD. CONTRACTORS: Mercury Marine, Oshkosh, WI.

F. (U) RELATED ACTIVITIES: NONE.

G. (U) OTHER APPROPRIATION FUNDS: Programs will be fielded with O&M,MC dollars.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604718M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Intelligence Systems (Engineering)
PROJECT NUMBER: C1463 PROJECT TITLE: Counterintelligence and Security Equipment

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY1991 ESTIMATE	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C1463	Counterintelligence and Security Equipment	943	1,174	370	791	CONT.	CONT.

B. (U) DESCRIPTION: This project funds purchasing and user evaluation of non-developmental-items (NDI) counterintelligence equipment and product improvement of the Counterintelligence Communication System (CCS). A continuing requirement exists to improve Marine Corps equipment in support of tactical counterintelligence special operations, human intelligence collection activities and Technical Surveillance Countermeasures (TSCM).

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Continued purchasing NDI TSCM and other counterintelligence equipment for Operational Test and Evaluation by counterintelligence teams. Continued the CCS product improvement program (PIP).

2. (U) FY 1991 Program: Continue purchasing NDI counterintelligence equipment. Continue research and development of the CCS PIP.

3. (U) FY 1992 Plans: Same as FY 1991 plan.

4. (U) FY 1993 Plans: Same as FY 1992 plan.

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NADC, Warminster, PA (CCS).
CONTRACTORS: NONE.

E. (U) RELATED ACTIVITIES: NONE.

F. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
PROCUREMENT	410	0	0	0	0	410
O&MMC	10	10	15	15	CONT.	CONT.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

UNCLASSIFIED

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604719M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Command/Control/Communications Systems (Engineering)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY1991 ESTIMATE	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C0053	JTIDS	2,858	6,651	2,246	4,084	CONT.	CONT.
C1929	ATACC	19,587	2,897	6,852	0	0	43,730
C2085a	MAFATDS	2,412	2,066	8,083	8,584	CONT.	CONT.
	TOTAL	24,857	11,614	17,181	12,668	CONT.	CONT.

a Name changed from FIREFLEX to MAFATDS in Fiscal Year 1990.

B. (U) DESCRIPTION: This program element provides funds for the engineering development of Marine Corps Command, Control, and Communications Systems which include Marine Tactical Command and Control Systems development and improvements. The projects are aimed toward more effective command and control of tactical forces during both amphibious and expeditionary land operations. This concept envisions an integrated air/ground tactical command and control system oriented toward amphibious expeditionary environment to meet the unique command, control and interoperability requirements of the Landing Force Commanders.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604719M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Command/Control/Communications Systems (Engineering)
PROJECT NUMBER: C0053 PROJECT TITLE: Joint Tactical Information Distribution System (JTIDS)

C. (U) DESCRIPTION: JTIDS integrates the high capacity, jam resistant, secure, digital communications capability provided by the Class 2H terminal into designated host platforms-Tactical Air Operations Module (TAOM) and Advanced Tactical Air Command Central (ATACC).

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Awarded contract to Naval Electronics Systems Engineering Center (NESEC), Vallejo, CA to proceed with full scale engineering development (FSED) of the JTIDS Interface Box (JIB) and the JTIDS Module (JM). Continued the development of Class 2H terminal. Continued to refine the requirements for the JTIDS capable TAOM (JTAOM).

2. (U) FY 1991 Program: Continue development of FSED JIB and JM. Award contract for development of FSED JTAOM. Continue the development of the Class 2H terminal. Initiate efforts to integrate host platforms.

3. (U) FY 1992 Plans: Continue with FY 1991 developments.

4. (U) FY 1993 Plans: Complete JIB/JM FSED development. Integrate ATACC/JM testing. Continue FSED JTAOM development.

5. (U) Program to Completion: This is a continuing program.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) Technology Changes: NONE.

2. (U) Schedule Changes: NONE.

3. (U) Cost Changes: $2.0 million congressional reduction in FY 1991.

F. (U) WORK PERFORMED BY: IN-HOUSE: MCRDAC Washington, DC; MCTSSA, Camp Pendleton, CA; NESEC, Vallejo, CA; ESD, Hanscom AFB, Bedford, MA. CONTRACTORS: Plessey Electronics System Corporation, Wayne, NJ; Litton Data Systems, Van Nuys, CA. Grumman Data Systems, Springfield, VA.

G. (U) RELATED ACTIVITIES: Program Element, 0604719M, ATACC. Joint Program (Air Force lead service) on development of JTAOM.

H. (U) OTHER APPROPRIATION FUNDS: NONE.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604719M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Command/Control/Communications Systems (Engineering)
PROJECT NUMBER: C1929 PROJECT TITLE: Advanced Tactical Air Command Central (ATACC)

C. (U) DESCRIPTION: This project will integrate hardware and software into a replacement system, capable of meeting the current operational deficiencies of the AN/TYQ-1 Tactical Air Command Central (TACC), and the AN/TYQ-3A Tactical Data Communications Central (TDCC). The ADA program will automate and enhance the now manual decision support/mission planning functions of the TACC. Additionally, the ATACC will provide increased interoperability through the integration of Joint Tactical Information Distribution System/Tactical Air Data Link-J (JTIDS/TADIL-J), and automated Joint Interoperability of Tactical Communications Systems (JINTACCS) message preparation and passing.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Completed System Design and Preliminary Design Reviews. Critical Design Review and commencement of software code and unit testing began. Completed prototype hardware integration.

2. (U) FY 1991 Program: Complete Developmental Testing. Complete Functional Qualification Testing (FQT), System Integration Testing (SIT), and Functional Acceptance Testing (FAT). Commence Operational Testing (OT).

3. (U) FY 1992 Plans: Complete operational testing (OT). Conduct Marine Corps Program Decision Meeting (MCPDM) and receive Approval for Service Use (ASU).

4. (U) FY 1993 Plans: Not appliable

5. (U) Program to Completion: Not applicable.

E. (U) WORK PERFORMED BY: IN-HOUSE: MCRDAC and SPAWAR (PMW-176), Washington, DC; MCTSSA, Camp Pendleton, CA. CONTRACTORS: Grumman Data Systems, Springfield, VA.

F. (U) RELATED ACTIVITIES: NONE.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

(U) PROCUREMENT	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
ATACC	0	0	0	6,900	21,931	28,831

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604719M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Command/Control/Communications Systems (Engineering)
PROJECT NUMBER: C2085 PROJECT TITLE: Multi-Service Advanced Field Artillery Tactical Data System (MAFATDS)

C. (U) DESCRIPTION: MAFATDS will consist of the digital fire support Command and Control (C2) automated software, fielded on Marine Corps common hardware. MAFATDS will automate for the Marine commander the integration and coordination of supporting arms.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Established Fleet Marine Force (FMF) User Testbed with fire support C2 rapid prototypes. Conducted a demonstration of AFATDS concept evaluation hardware and software with 11th Marines, Camp Pendleton, CA. The AFATDS full scale engineering development (FSED) contract was awarded in April. Established the Requirements Definition Working Group (RDWG) between Army TRADOC System Manager (TSM), Fort Sill, OK and Marine Corps Combat Development Center (MCCDC), Quantico, VA.

2. (U) FY 1991 Program: Continue AFATDS Version 1 (V1) software development. Complete System Design Review (SDR), Software Specification Review (SSR), and Preliminary Design Review (PDR). Utilize FMF Testbed to evaluate automated, digital C2 equipment, doctrine and procedures.

3. (U) FY 1992 Plans: Continue AFATDS V1 software development. Complete the Critical Design Reviews (CDR I & II). Continue FMF Testbed operation and feed results into AFATDS development. Develop the AFATDS Version 2 (V2).

4. (U) FY 1993 Plans: Complete Field Development Test & Evaluation and Initial Operational Test & Evaluation. First Unit Equipped (FUE) with V1 software will be concurrent with the Army. Continue work on V2 software.

5. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MCCDC and MCRDAC, Quantico, VA; MCTSSA, Camp Pendleton, CA; TSM, Fort Sill, OK. CONTRACTORS: Magnavox Systems, Inc., Fort Wayne, IN.

F. (U) RELATED ACTIVITIES: Army Program Element 0203726A, Advanced Field Artillery Tactical Data System, Project D322, AFATDS.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands) PROCUREMENT

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
MAFATDS	0	0	0	0	5,390	5,390

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604727N BUDGET ACTIVITY: 4-Tactical Programs
PROGRAM ELEMENT TITLE: Joint Stand-Off Weapons Program (JSOW)
PROJECT NUMBER: W2068
PROJECT TITLE: Advanced Interdiction Weapons System (AIWS)

PICTURE NOT AVAILABLE

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	TO COMPLETE
Program Milestones		MS-II Nov/92			MS-IIIA 3Q/96 MS-IIIB 3Q/97
Engineering Milestones			PDR May/92		CDR 4Q/94
T&E Milestones	OT-I Jan/91			DT-IIA May/93	DT-IIB 2Q/94 DT-IIC 3Q/95 OT-IIA 3Q/95 OT-IIB 2Q/96
Contract Milestones		FSD Nov/92			PRODUCTION (LRIP) 3Q/96

BUDGET ($K)	FY 1990	FY 1991	FY 1992	FY 1993	Program Total
Major Contract	2,708.0	6,871.0	35,200.0	48,000.0	Continuing
Support Contract	176.0	169.0	657.0	670.0	Continuing
In-House Support	5,682.0	9,404.0	17,590.0	18,907.0	Continuing
GFE/ Other	-0-	-0-	-0-	-0-	Continuing
TOTAL	8,566.0	16,444.0	53,447.0	67,577.0	Continuing

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604727N BUDGET ACTIVITY: 4-Tactical Programs
PROGRAM ELEMENT TITLE: Joint Stand-Off Weapons Program (JSOW)
PROJECT NUMBER: W2068
PROJECT TITLE: Advanced Interdiction Weapons Systems (AIWS)

B. (U) DESCRIPTION: The AIWS is an air-to-ground weapon that will be used to attack targets during day, night, and in adverse weather conditions. The AIWS will be employed on the F/A-18, A-6, and AV-8B aircraft. With its launch-and-leave capability it will be able to provide several target kills per aircraft sortie. The AIWS baseline capability will be achieved by taking advantage of recent advances in guidance and control technologies, low cost, kinematically efficient airframes of composite materials, and prior initiatives in signature management. The baseline design allows for a preplanned product improvement (P3I) that will allow nearly unlimited growth potential through evolutionary enhancements such as affordable terminal guidance, a data link, a unitary warhead, and propulsion as required.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments
   a. Continued Demonstration/Validation (DEM/VAL) efforts.
   b. Continued Full Scale Development (FSD) planning.
   c. Prepared for Milestone II decision.
   d. Continued P3I planning efforts.

2. (U) FY 1991 Program
   a. Conduct OT-I Operational Assessment.
   b. Complete DEM/VAL.
   c. Conduct FSD source selection (open competition).
   d. Award a systems engineering contract.

3. (U) FY 1992 Plans
   a. Milestone II Decision.
   b. Begin FSD.
   c. Conduct Preliminary Design Review (PDR).

4. (U) FY 1993 Plans
   a. Continue FSD efforts.
   b. Commence DT-IIA testing.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604727N **BUDGET ACTIVITY:** 4-Tactical Programs
PROGRAM ELEMENT TITLE: Joint Stand-Off Weapons Program (JSOW)
PROJECT NUMBER: W2068
PROJECT TITLE: Advanced Interdiction Weapons Systems (AIWS)

5. (U) Program to Completion: This is a continuing program

D. (U) WORK PERFORMED BY: IN-HOUSE: NWC, China Lake, CA; PMTC, Pt Mugu, CA; NAC, Indianapolis, IN; NAS, Pax River, MD; NADC, Warminster, PA; DTRC, MD. CONTRACTORS: Boeing Aerospace, Seattle, WA; McDonnell Douglas/Hughes, St Louis, MO; Texas Instruments/LTV, Lewisville, TX.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) Technology Changes:

o Baseline AIWS changed to include a GPS capability for increased accuracy.

2. (U) Schedule Changes:

o Delayed the FSD contract award to 1st quarter FY-92.

o MS-IIIA delayed until April 1996.

3. (U) Cost Changes: None

F. (U) PROGRAM DOCUMENTATION:
JMSNS 12/85
OR 03/88
ACQ Plan 07/88 - (Currently being updated)
SCP 03/89
TEMP 04/89 - (Currently being updated)
ADM 06/89
DCP - (Currently being updated)

G. (U) RELATED ACTIVITIES: N/A.

H. (U) OTHER APPROPRIATION FUNDS: N/A

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: N/A

J. (U) TEST AND EVALUATION: N/A

FY 1992/1993 BIENNIAL RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604761N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: INTELLIGENCE ENGINEERING

A. (U) RESOURCES: (DOLLARS IN THOUSANDS)

PROJECT NUMBER	TITLE	FY 90 ACTUAL	FY 91 EST.	FY 92 EST.	FY 93 EST.	TO COMPLETE	TOTAL PROGRAM
R0809	E/O SENSOR	467	0	0	0	0	467
T0772	FME	4,567	1,523	2,026	2,049	CONT.	CONT.
	TOTAL	5,034	1,523	2,026	2,049	CONT.	CONT.

B. ( ) DESCRIPTION:

( ) THE ELECTRO-OPTIC (E/O) SENSOR PROJECT DEVELOPS UNIQUE EQUIPMENT PACKAGES CAPABLE OF COLLECTING AND ANALYZING INFORMATION ABOUT ELECTRO-OPTIC HARDWARE. THE PURPOSE IS TO OBTAIN FINE-GRAINED INTELLIGENCE INFORMATION AND SCIENTIFIC AND TECHNICAL DATA FOR USE IN ASSESSING

( ) FOREIGN MATERIAL ACQUISITION AND EXPLOITATION (FME) PROJECT FUNDS LABORATORY ANALYSIS

THE FME PROGRAM ALSO SUPPORTS LIMITED ABILITY TO ACQUIRE HIGH INTEREST SYSTEMS' EXPLOITATION OF THESE SYSTEMS

FY 1992/1993 BIENNIAL RDT&E DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604761N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: INTELLIGENCE ENGINEERING
PROJECT NUMBER: T0772 PROJ. TITLE: FOREIGN MATERIAL ACQUISITION/EXPLOITATION

C. (U) DESCRIPTION: THE FOREIGN MATERIAL ACQUISITION AND EXPLOITATION PROJECT PROVIDES HIGH LEVERAGE COST BENEFITS THROUGH ACQUISITION OF FOREIGN WEAPONS AND SENSOR SYSTEMS AND THE SUBSEQUENT EXPLOITATION OF THOSE SYSTEMS FOR POTENTIAL VULNERABILITIES AND COUNTERMEASURES.

D. ( ) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. ( ) FY 1990 ACCOMPLISHMENTS:
   a. ( )

   (1). ( )
   (2). ( )
   (3). ( )

   (4). ( )
   (5). ( )
   (6). ( )
   (7). ( )

   (8). ( )
   (9). ( )
2. ( ) FY 1991 PROGRAM:
   a. ( )

3. ( ) FY 1992 PLANS:
   a. ( )

4. ( ) FY 1993 PLANS:
   a. ( )

5. (U) PROGRAM TO COMPLETION: THIS IS A CONTINUING PROGRAM

D. (U) WORK PERFORMED BY: IN HOUSE: NAVAL RESEARCH LABORATORY, WASHINGTON, D.D.; NAVAL UNDERSEA SYSTEMS CENTER, NEWPORT, R.I.; NAVAL SHIP RESEARCH AND DEVELOPMENT CENTER, CARDEROCK, MD.; NAVAL UNDERWATER WEAPONS SYSTEMS ENGINEERING STATION, KEYPORT, WA; NAVAL AIR DEVELOPMENT CENTER, WARMINSTER, PA; NAVAL WEAPONS SUPPORT CENTER, CRANE, IN; NAVAL WEAPONS CENTER, CHINA LAKE, CA; PACIFIC MISSILE TEST CENTER, PT. MUGU, CA; NAVAL SURFACE WEAPONS CENTER, DAHLGREN, VA. CONTRACTORS: LTV/VOUGHT AEROSPACE, DALLAS, TX.

E. (U) RELATED ACTIVITIES: NONE.
F. (U) OTHER APPROPRIATION FUNDS: NONE.
G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604771N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Medical Development (Engineering)
PROJECT NUMBER: M0933 PROJECT TITLE: Medical/Dental Equipment Development

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMP.	TOTAL PROGRAM
M0933	Medical/Dental Equipment Development	4,114	3,979	4,160	4,288	Cont.	Cont.

B. (U) DESCRIPTION: The equipment developed in this program will greatly augment the treatment of combat casualties by improving the battlefield and shipboard availability of resuscitation fluids and wash solutions for stored blood, facilitate the thawing and washing of frozen blood for transfusions, improve the rewarming of hypothermic casualties in extremely cold environments, and permit the rapid diagnosis of diseases, injuries, and clinical status of casualties in remote locations.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
- Continued engineering development of the Resuscitation Fluids Production System (REFLUPS) to complete fabrication and begin environmental testing of engineering development model
- Develop training courses, equipment and curriculum for training of REFLUPS operators

2. (U) FY 1991 Program:
- Complete environmental test and evaluation of REFLUPS
- Complete FDA Product Material Application for REFLUPS and validation of product for FDA approval
- Complete instructors' and students' lesson guides and training courses for REFLUPS
- Begin planning for red blood cell wash requirements by direct hook-up to REFLUPS to increase washing speed and sterility

3. (U) FY 1992 Plans:
- Complete shipboard test and evaluation of REFLUPS
- Successfully obtain FDA approval
- Initiate acquisition and deployment of REFLUPS
- Begin engineering development of blood cell washing hook-up for REFLUPS
- Begin engineering development of the frozen red blood cell rapid thawing device transitioned from the 6.3 program
- Continue development of radiofrequency rewarming device for hypothermic casualties

PROGRAM ELEMENT: 0604771N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Medical Development (Engineering)
PROJECT NUMBER: M0933 PROJECT TITLE: Medical/Dental Equipment Development

- Begin development of diafiltration device for rapid sterile washing of thawed red blood cells to simplify procedures and extend the post-thaw storage shelf-life
- Begin development of transcutaneous clinical biosensors for rapid, noninvasive diagnosis of casualties clinical chemistries

4. (U) FY 1993 Plans:
- Continue development of blood cell washing hook-up to REFLUPS
- Continue development and initiate field testing of frozen red blood cell rapid thawing device
- Continue development and field testing of hypothermic rewarming device
- Continue development of specific transcutaneous biosensors for field clinical diagnostics

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: In House: Naval Ocean Systems Center, San Diego, CA; Contractors: Sterimatics Corporation, Bedford, MA

E. (U) RELATED ACTIVITIES: This program is coordinated through the Armed Services Biomedical Research Evaluation and Management Committee. Work on the REFLUPS is a tri-Service effort that is jointly funded by the Army and Navy.

F. (U) OTHER APPROPRIATION FUNDS: Not Applicable

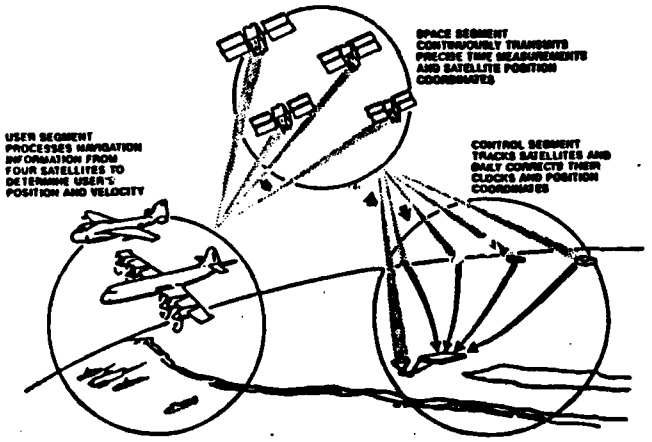
G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604777N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: NAVSTAR Global Positioning System (GPS)
PROJECT NUMBER: X0921 PROJECT TITLE: NAVSTAR GPS Equipment

POPULAR NAME: NAVSTAR GPS

NAVSTAR GPS PROGRAM SEGMENTS



A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	To Complete
Program Milestones		MSIIIB 4TH QTR			
Engineering Milestones					
T&E Milestones		COMPLETE OT IIC BEGIN OT III			COMPLETE OT III
Contract Milestones					

BUDGET ($K)	FY 1990	FY 1991	FY 1992	FY 1993	Program Total (To Complete)
Major Contract	13,168	19,717	23,980	30,565	Continuing
Support Contract	1,439	1,719	1,751	1,668	Continuing
In-House Support	27,458	30,343	24,650	19,357	Continuing
GFE/ Other	150	151	123	124	Continuing
Total	42,215	51,930	50,504	51,714	Continuing

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604777N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: NAVSTAR Global Positioning System (GPS)
PROJECT NUMBER: X0921 PROJECT TITLE: NAVSTAR GPS Equipment

B. (U) DESCRIPTION: GPS is a space-based radio positioning and navigation system that provides users with worldwide, all-weather, three-dimensional position, velocity and precise time data based on a constellation of 21 or more satellites. GPS provides a common navigation grid for land, air and sea units for coordinated operations. Navy's portion of the GPS program develops user equipment and provides for the integration and testing of this equipment on each class of aircraft, ship and submarine, as well as for the planning necessary to support the equipment when introduced into the fleet.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:

a. (U) Began integration engineering on the A-6E, AV-8B, KC-130, OV-10D, VH-3D, SH-60F UD, ES-3A UD, HC-130 and F/A-18 aircraft.

b. (U) Continued integration engineering on the FFG-7 ship, EA-6B, VH-60, MH-53E, E-2C, P3C UDIII, S-3 and HU-25 aircraft.

c. (U) Completed integration engineering on the E-6A, EP-3E aircraft and LCAC, SSN-637, T-AGS 38, CV/CVN, CG-26, SWCL and LST-1179 ships.

d. (U) Continued systems integration in the Combat Direction System (CDS) Electrostatic Stabilized Gyro Navigation (ESGN), Carrier Navigation System (CVNS) and the AN/WSN-5.

e. (U) Completed systems integration in the AN/SSN-2, Standard Attitude Heading Reference System (SAHRS), LTN-72, ASN-139 and ASN-130.

f. (U) Completed cesium standard and ground maser clock technology test and analysis.

g. (U) Began engineering of the mini-airborne GPS receiver (MAGR).

h. (U) Continued development of the digital to analog converter (DAC).

i. (U) Continued efforts in the areas of integration design support, data reduction, platform test support, deficiency resolution and user equipment design analysis.

2. (U) FY 1991 PROGRAM:

a. (U) Begin integration engineering on the RP-3 and F-14D aircraft.

b. (U) Continue integration engineering on the A-6E, AV-8B, SH-60F UD, EA-6B, KC-130, OV-10D, VH-3D, MH-53E, P-3C UDIII, S-3, HC-130 and F/A-18 aircraft.

c. (U) Complete integration engineering on the VH-60, E-2C and HU-25 aircraft and FFG-7 ship.

d. (U) Continue systems integration in the CDS.

e. (U) Begin MAGR test and evaluation.

f. (U) Complete DAC development.

g. (U) Complete operational testing required to verify suitability of recently incorporated improvements.

h. (U) Complete systems integration in the ESGN, CVNS and AN/WSN-5.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604777N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: NAVSTAR Global Positioning System (GPS)
PROJECT NUMBER: X0921 PROJECT TITLE: NAVSTAR GPS Equipment

i. (U) Continue efforts in the areas of integration design support, data reduction, platform test support, deficiency resolution and user equipment design analysis.

j. (U) Begin shipboard Tactical Air Navigation (TACAN) replacement development.

k. (U) Begin OT-III on aircraft.

3. (U) FY 1992 PLANS:

a. (U) Begin integration engineering on the ES-3A UD, SH-60B UD, and SH-2G aircraft.

b. (U) Continue integration engineering on the A-6E, RP-3, SH-60F UD, KC-130, EA-6B, VH-3D, S-3, F-14D, F/A-18 and AV-8B aircraft.

c. (U) Complete integration engineering on the OV-10D, MH-53E, P-3 UDIII, and HC-130 aircraft.

d. (U) Complete systems integration in the CDS.

e. (U) Continue MAGR test and evaluation.

f. (U) Continue efforts in the areas of integration design support, data reduction, platform test support, deficiency resolution and user equipment design analysis.

g. (U) Continue shipboard TACAN replacement development.

4. (U) FY 1993 PLANS:

a. (U) Begin integration engineering on the C-9, C-12, RH-53D, C-2A, T-45, US-3A, and SH-3H aircraft.

b. (U) Continue integration engineering on the S-3, F-14D, SH-2G, T-45, ES-3A UD, and RP-3 aircraft.

c. (U) Complete integration engineering on the A-6E, SH-60B UD, SH-60F UD, KC-130, EA-6B, VH-3D, and F/A-18 aircraft.

d. (U) Continue MAGR test and evaluation.

e. (U) Continue efforts in the areas of integration design support, data reduction, platform test support, deficiency resolution and user equipment design analysis.

f. (U) Continue shipboard TACAN replacement development.

5. (U) PROGRAM TO COMPLETION:

This is a continuing program.

D. (U) WORK PERFORMED BY:

IN-HOUSE: Air Force Systems Command (Space Systems Division), Joint Program Office, Los Angeles, CA: NAVAIRDEVCEN, Warminster PA; NAVAIRTESTCEN, Patuxent River, MD.

CONTRACTORS: Grumman Aerospace Corp., Long Island, NY; Boeing Company, Seattle, WA; McDonnell Douglas, St. Louis, Missouri.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604777N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: NAVSTAR Global Positioning System (GPS)
PROJECT NUMBER: X0921 PROJECT TITLE: NAVSTAR GPS Equipment

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
1. (U) TECHNOLOGY CHANGES: None
2. (U) SCHEDULE CHANGES: MS IIIB has been delayed to 4th Qtr FY 91 to allow for additional operational testing to verify suitability of recently incorporated improvements.
3. (U) COST CHANGES: None

F. (U) PROGRAM DOCUMENTATION:

o Joint Acquisition Plan	Dec 1989
o Multi-Service TEMP	Mar 1990
o Joint ILS Plan	Sep 1986
o Navy Training Plan	Mar 1990
o DCP #135	Apr 1990

G. (U) RELATED ACTIVITIES:
o Program Element 0603203F (Advanced Avionics for Aircraft)
o Program Element 0603601F (Conventional Weapons Technology)
o Program Element 0305164F (NAVSTAR GPS User Equipment)
These are Air Force program elements that contribute to the development and test of GPS receivers and associated peripheral equipment.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
OPN	10,579	5,800	16,997	13,760	6,052	129,588
APN BA 1	1,600	1,080	1,741	3,824	30,213	44,858
APN BA 5	1,630	0	35,065	70,695	380,051	489,880
APN BA 7	2,900	0	8,761	6,130	13,370	34,187
SCN	1,450	1,434	1,418	1,419	7,229	16,050

I. (U) INTERNATIONAL COOPERATIVE AGREEMENT: None

J. (U) TEST AND EVALUATION DATA: Not applicable to this submission.

FY 1992/3 RDT&E, NAVY DESCRIPTION SUMMARY

PROGRAM ELEMENT: 0604780M **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Joint Interoperability of Tactical Command and Control Systems, Marine Corps
PROJECT NUMBER: C1079 **PROJECT TITLE:** Joint Interoperability of Tactical Command and Control Systems (JINTACCS)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMP	TOTAL PROGRAM
C1079	JINTACCS	1,239	973	788	1,036	CONT.	CONT.

B. (U) DESCRIPTION: This program supports Marine Corps participation in the Joint Chiefs of Staff (JCS)-sponsored JINTACCS program which provides for the development of joint character and bit-oriented message standards and procedures.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Participated in the development of Volumes I, II, and III of the Variable Message Format Technical Interface Design Plan (VMF TIDP). Conducted Joint Tactical Air Operations (JTAO) certification of the Tactical Air Operations Central (TAOC) and began Tactical Air Data Information Link (TADIL) B certification. Enhanced the U. S. Message Text Format (USMTF) Editor.

2. (U) FY 1991 Program: Continue the system engineering effort in the development of change proposals to the VMF as an evolving joint standard. Begin the Marine Corps participation in the conduct of joint interoperability testing and certification on command, control, and communication information (C3I) systems.

3. (U) FY 1992 Plans: Continue the Marine Corps system engineering support for the development, testing and certification of VMF as an evolving joint standard. Participate in JTAO recertification testing.

4. (U) FY 1993 Plans: Continue the Marine Corps system engineering support for the development, testing and certification of Variable Message Format (VMF) as an evolving joint standard.

5. (U) Program to Completion: This is a continuing program.

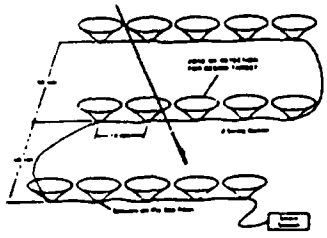
D. (U) WORK PERFORMED BY: IN-HOUSE: JTC3A, Reston, VA; MCRDAC, Quantico, VA; MCTSSA, MCB, Camp Pendleton, CA. CONTRACTORS: Eagle Technology, Inc., Dumfries, VA; NSR Corp., Colorado Springs, Co.

E. (U) RELATED ACTIVITIES: Program Elements: 0604719M, JTIDS and ATACC; and 0206626M, Tactical Air Operations Module (TAOM).

F. (U) OTHER APPROPRIATION FUNDS: NONE.
G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604784N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Fixed Distributed System (FDS)
PROJECT NUMBER: X1312 PROJECT TITLE: Fixed Distributed System (FDS)
POPULAR NAME: FDS



A. (SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1990	FY 1991	FY 1992	FY 1993	To Complete
Program Milestones					
EDM IOC					
MS-III					3 Qtr FY96
Engineering Milestones					
CDR (UW Segment) 6/90					
PDR (Shore Segment)		12/90			
CDR (Shore Segment)					
T&E Milestones					
DT-1B	11/89				
DT-2A	3/90				
DT-2B					
DT-2C					
DT-2D (TECHEVAL)					
OT-2 (OPEVAL)					
Contract Milestones					
FDS U/W FSED	1/90				
FDS Shore FSED		6/91			

BUDGET ($K)	FY 1990	FY 1991	FY 1992	FY 1993	To Comp/Prg Tot
Major Contract	120,248	194,629	213,326	175,184	Cont./Cont.
Support Contract	6,535	7,304	7,282	7,485	Cont./Cont.
In-House Support	5,341	6,819	8,245	10,559	Cont./Cont.
Other	248	283	301	308	Cont./Cont.
Total	132,372	209,035	229,154	193,536	Cont./Cont.

PROGRAM ELEMENT: 0604784N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Fixed Distributed System (FDS)
PROJECT NUMBER: X1312 PROJECT TITLE: Fixed Distributed System (FDS)

B. ( ) DESCRIPTION: The Fixed Distributed System (FDS) is part of the Integrated Undersea Surveillance System (IUSS). IUSS provides the

FDS is a

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. ( ) FY 1990 Accomplish ents: Initiated competitive acquisition request for Shore System Information Processing Segment (SSIPS) Full Scale Engineering Development (FSED) contract; Released final design Awarded FSED contract; Initiated fabrication of Developed final specifications for Conducted final test of Awarded two competitive Contracts; Conducted Critical Design Review (CDR) for Conducted environmental and acoustic surveys Completed

Conducted

PROGRAM ELEMENT: 0604784N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Fixed Distributed System (FDS)
PROJECT NUMBER: X1312 PROJECT TITLE: Fixed Distributed System (FDS)

2. ( ) FY 1991 Program: Conduct Preliminary Design Review (PDR); Award competitive FSED contract; Fabricate Manufacture and test First Article and conduct Production Readiness Review (PRR) Perform environmental and acoustic surveys Conduct Begin equipment installation Conduct final Conduct deployment ship,

3. ( ) FY 1992 Plans: Conduct CDR and begin, development; Complete installation Initiate assembly Start installation. Conduct Conduct Install Begin deliveries Conduct; Rent ship and conduct

4. ( ) FY 1993 Plans: Conduct incremental testing and evaluation Begin integration Conduct Complete production Continue deployment Begin outfitting. Complete

5. ( ) Program to Completion: This is a continuing program; Conduct incremental testing and evaluation; Conduct performance evaluation COMOPTEVFOR assessment Conduct Conduct Develop Complete Conduct MS-III; Procure Install and chechout Conduct initial RTF and ASW school; Conduct FDS-1 OPEVAL (OT-2); Commence construction/ Obtain approval Develop and test

PROGRAM ELEMENT: 0604784N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Fixed Distributed System (FDS)
PROJECT NUMBER: X1312 PROJECT TITLE: Fixed Distributed System (FDS)

D. (U) WORK PERFORMED BY: In-house: NOSC, San Diego, CA; NCEL, Port Hueneme, CA; NRL, Washington, DC. Contractors: AT&T Technologies, Inc., Greensboro, NC; AT&T/Bell Laboratories, Whippany, NJ; GE, Syracuse, NY; IBM Corporation, Manassass, VA; TRW, Inc., McLean, VA; AMRON, INC., Falls Church, VA; Simplex Wire and Cable Company, Portsmouth, NH; STC Submarine Systems, Inc, Portland, OR.

E. (U) COMPARISON WITH REVISED FY 1991 PRESIDENT'S BUDGET:

1. (U) TECHNICAL CHANGES: None.
2. (U) SCHEDULE CHANGES: None.
3. (U) COST CHANGES: None.

F. (U) PROGRAM DOCUMENTATION:

Milestone I Decision	13 May 1986
Navy Decision Coordination Paper (NDCP)	13 May 1986
Test and Evaluation Master Plan (TEMP)	25 Aug 1986
Integrated Logistic Support Plan (ILSP)	Jan 1986
Acquisition Plan #87-28, FDS	19 Aug 1988
Acquisition Plan #84-12, SOSUS	23 Aug 1985
ILSP Revised	Mar 1989
TEMP Revised	13 Feb 1989
Decision Coordination Paper (DCP)	10 May 1989
Milestone II Decision	22 Sep 1989

G. (U) RELATED ACTIVITIES: PE 0204311N, Integrated Undersea Surveillance Systems (IUSS); PE 0204311N, Surveillance Direction System (SDS).

H. (U) OTHER APPROPRIATION FUNDS:

APPN /P-1	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
MILCON	18,620	0	0	0	CONT.	CONT.
OPN #XX	0	0	4,000	800	CONT.	CONT.
OMN	0	0	6,402	6,597	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION DATA: Not Applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605151M BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Studies and Analysis Support, Marine Corps
PROJECT NUMBER: C0030 PROJECT TITLE: Studies and Analysis, Marine Corps

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY1991 ESTIMATE	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C0030	Studies and Analysis	1,106	2,073	2,170	2,247	CONT.	CONT.

B. (U) DESCRIPTION: Program provides analytical foundation for Marine Corps Concept Based Requirements System. Results of Mission Area Analyses are integrated into Marine Air Ground Task Force (MAGTF) Master Plan providing blueprint for improvements to doctrine, training, force structure and weapons systems. Program also provides analytical support for resolution of current problems identified by the operating forces.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Initiated 22 study projects, and completed eight study projects including: Marine Corps Wartime Casualty Rates in the Long-Range (CASRATE) Study, High Speed Transporter (HST) Study and the Battlefield Intelligence Study and seven Mission Area Analyses.

2. (U) FY 1991 Program: Initiate twenty studies/analyses including: MAGTF Mine Laying/Clearing Systems in the Midrange, Expeditionary CSS Study, MAGTF Sustainability, and four Mission Area Analyses; plus Phase II of ten studies initiated in FY 1990.

3. (U) FY 1992 Plans: Initiate twenty to twenty-two studies/analyses (per year) including Mission Area Analyses at the rate of four to six per year.

4. (U) FY 1993 Plans: Continue to initiate studies.

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: MAGTF Warfighting Center, MCCDC, Quantico, VA and Marine Corps and other Service Top Level Schools; FMF Units. CONTRACTORS: TBD.

E. (U) RELATED ACTIVITIES: Program Element 0605153M, Center for Naval Analyses - Marine Corps Studies System Support, which provides supplementary analytic capability.

F. (U) OTHER APPROPRIATION FUNDS: NONE.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

UNCLASSIFIED

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0605152N Budget Activity: 6
Program Element Title: Studies and Analysis Support, Navy

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMP	TOTAL PROGRAM
M0106	Naval Medical Support Capability	94	103	113	154	Cont	Cont
R0132	CNO Program Analysis and Evaluation	564	777	744	950	Cont	Cont
R0133	National Academy of Sciences/Naval Studies Board	1,268	642	931	1,192	Cont	Cont
R0147	CNO Oper Strategy & Tactical Effectiveness Analysis	834	964	1,167	1,545	Cont	Cont
R2040	Soviet Ship Vulnerability (SSVP) Program	413	765	1,129	1,246	Cont	Cont
R2097	MPT Studies	0	0	401	394	Cont	Cont
W2092	Naval Aviation Studies Support	*	497	1,812	1,879	Cont	Cont
TOTAL		3,173	3,748	6,297	7,360	Cont	Cont

* Studies funded from various sources.

B. (U) DESCRIPTION: This program provides analytical support to the Secretary of the Navy and the Chief of Naval Operations as a basis for major policy, planning, and acquisition program execution decisions. It supports research and development strategy development and planning. It supports studies in the areas of manpower, personnel and training, and aviation. It develops analytical tools for evaluating effectiveness of U.S. weapons against Soviet ships and submarines.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0605152N **Budget Activity: 6**
Program Element Title: Studies and Analysis Support, Navy
Project Number: M0106 **Project Title: Naval Medical Support Capability**

C. (U) DESCRIPTION: The Navy Medical Command has an ongoing need for evaluation of resource management techniques. This project provides an essential management tool to examine and investigate biomedical operations, functions, allocations of resources, personnel training, detailing, and other problems that may affect the relevancy, effectiveness, and efficiency of medical support of the Navy and Marine Corps.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:

a. (U) Identified performance criteria and developed protocols to assess training, utilization, and socialization issues.

b. (U) Initiated data collection.

2. (U) FY 1991 PROGRAM:

a. (U) Identify factors associated with the retention of Dental Officers and develop intervention strategies to compete more effectively with the private sector.

b. (U) Identify medical information requirements to manage more effectively the delivery of health care aboard ships by examining the feasibility of the use of Shipboard Automated Medical System.

3. (U) FY 1992 PLANS: Complete efforts started in FY 1991.

4. (U) FY 1993 PLANS:

a. (U) Identify demographic and psychosocial correlates of inappropriate medical utilization and recommend screening techniques and other intervention strategies to modify demand for outpatient medical services.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: Naval Health Research Center, San Diego, CA; Naval School of Health Sciences, Bethesda, MD.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0605152N Budget Activity: 6
Program Element Title: Studies and Analysis Support, Navy
Project Number: R0132 Project Title: CNO Program Analysis and Evaluation

C. (U) DESCRIPTION: This project provides analytical support to CNO and SECNAV in evaluation of overall balance within total Navy programs. Includes such tasks as (a) evaluation of force capabilities and requirements, (b) analysis of effectiveness of systems under development, and (c) SECDEF directed parametric cost analyses of major Navy programs. Deliverables consist of formal, structured documents containing or leading to conclusions and/or recommendations.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:

a. (U) Continued research and analysis, providing results in support of Navy program decision making. Areas of research included sealift enhancement capability, manpower quality to unit readiness, ordnance sustainability, and surface ship readiness measures. Initiated research to evaluate Navy manpower mix and opportunities for restructuring, and to forecast and model Navy combat casualty rates.

2. (U) FY 1991 PROGRAM:

a. (U) Conduct analyses over a broad range of issues -- from the assessment of application for new technology to the development and testing of improved tactics for today's forces.

b. (U) Research to include continuing efforts to enhance understanding and analysis of a variety of sustainability and readiness programmatic issues.

3. (U) FY 1992 PLANS: Conduct analyses covering a broad range of topics.

4. (U) FY 1993 PLANS: Conduct analyses covering a broad range of topics.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: CONTRACTORS: PRESEARCH Inc., Arlington, VA; Stanley Associates, Arlington, VA; ERC, McLean, VA; Synergy Inc., Washington, D.C.; RCI, Vienna, VA; KETRON, Inc., Malvern, PA; MATHTECH, Inc., Falls Church, VA; CNA, Alexandria, VA.

F. (U) RELATED ACTIVITIES: Program Element 0605153M, (Marine Corps Operations Analysis Group); Program Element 0605151M, (Studies and Analysis Support, Marine Corps); Program Element 0605154N, (Center for Naval Analyses, Navy).

G. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0605152 Budget Activity: 6
Program Element Title: Studies and Analysis Support, Navy
Project Number: R0133 Project Title: National Academy of Sciences/ Naval Studies Board/ASN Studies

C. (U) DESCRIPTION: As mutually agreed upon between the Chief of Naval Operations and the President of the National Academy of Sciences and with appropriate attention to the influence of the domestic economy, national objectives, social imperatives and anticipated military requirement, the Board for Naval Studies will conduct and report upon surveys and studies in the field of scientific research and development applicable to the operation and function of the Navy. Reports consist of a briefing to the Assistant Secretary of the Navy (Research, Development and Acquisition) (ASN(RDA)) and the Chief of Naval Operations and staff, and written technical reports at the conclusion of each stage of the study (at least annually) as an archival contribution of the Board. This program also fund specific studies in support of the Secretary of the Navy in high priority areas, dealing with policy matters and planning and acquisition decisions.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:

a. (U) Initiated the Congressional mandated Future Carrier Technology study.

b. (U) Continued studies on implications of emerging technologies.

c. (U) Provided support for Naval Hydrodynamics Symposium series.

d. (U) Conducted studies in the field of scientific research and development applicable to the Navy.

2. (U) FY 1991 PROGRAM:

a. (U) Continue the Future Carrier Technology study.

b. (U) Conduct studies in scientific research and development.

c. (U) Provide support for C. H. Davis Lecture series.

3. (U) FY 1992 PLANS:

a. (U) Conduct in-depth study of selected emerging technologies.

b. (U) Provide support for Naval Hydrodynamics Symposium series.

c. (U) Support research and development strategy development.

d. (U) Conduct studies in support of ASN(RDA).

4. (U) FY 1993 PLANS:

a. (U) Continue in-depth study of selected emerging technologies.

b. (U) Provide support for C. H. Davis Lecture series.

c. (U) Provide support for R&D strategy development and planning.

d. (U) Conduct studies in support of ASN(RDA).

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: Naval Ocean Systems Center, San Diego, CA. Naval Postgraduate School, Monterey, CA; Naval War College, Newport, RI. CONTRACTORS: National Academy of Sciences, Washington, D.C.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0605152N Budget Activity: 6
Program Element Title: Studies and Analyses Support, Navy
Project Number: R0147 Project Title: CNO Operational Strategy and Tactical Effectiveness Analyses

C. (U) DESCRIPTION: This project provides CNO and SECNAV direct analyses of Navy policy, strategy acquisition, and program planning in meeting the following objectives: (a) producing study results impacting upon important programs/issues, (b) identifying and evaluating policy and strategy alternatives and doctrine, and (c) evaluating the capabilities of programmed forces to accomplish missions assigned to the Navy. Deliverables consist of formal, structured documents containing or leading to conclusions and/or recommendations.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:

a. (U) Continued studies on Navy program planning issues in force structures, fleet combat operations, readiness, sustainability, logistics support, C3, surveillance, intelligence, manpower, personnel, and training. Performed further research/assessments of ship, aircraft and base readiness resources to readiness measures and achievements.

b. (U) Analyzed a variety of sustainability issues.

c. (U) Initiated research to evaluate the Navy's recruiting strategy and to develop an analysis of capabilities for input to JCS net assessment process.

2. (U) FY 1991 PROGRAM:

a. (U) Address Navy program planning issues important to the development of Navy programs for FY 1994 and beyond.

b. (U) Conduct analyses to improve the effectiveness of current weapon systems, help decision makers to select realistic, more effective new systems and continue development of resources to readiness measurement.

c. (U) Further work is planned in such areas as combat logistics, force planning, and personnel selection and retention.

3. (U) FY 1992 PLANS: Continue efforts to conduct studies and perform analysis evaluating concepts and strategies, defining requirements, assessing capabilities, reviewing program alternatives and analyzing program and planning issues.

4. (U) FY 1993 PLANS: Continue 1992 efforts.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: CONTRACTORS: PRESEARCH, Inc., Arlington, VA; MATHTECH, Inc., Falls Church, VA; Synergy Inc., Washington, D.C.; PAI, Inc., Vienna, VA; HUMRO, Alexandria, VA; CNA, Alexandria, VA.

F. (U) RELATED ACTIVITIES: PE 0605153M, Marine Corps Operation Analysis Group; PE 0605151M, Studies and Analysis Support, Marine Corps; PE 0605154N, Center for Naval Analyses, Navy.

G. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0605152N Budget Activity: 6
Program Element Title: Studies and Analysis Support, Navy
Project Number: R2040 Project Title: Soviet Ship Vulnerability Program

C. (U) DESCRIPTION: This project assesses effectiveness of U.S. Navy weapons against Soviet and other threat ships and submarines. It develops and upgrades analytical methods and models for evaluating weapon lethality against Soviet and other targets and for predicting threat ship/submarine vulnerability. It provides information needed for warhead design during acquisition processes, in-service weapon upgrades, weapon loadout requirements, and for tactical applications of weapons.

D. ( ) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:
   a. ( ) Initiated target descriptions (TD) for
   b. ( ) Completed TDs for
   c. ( ) Completed terminal weapon effectiveness assessment (TWEA) for
   d. ( ) Completed TWEA for
   e. (U) Update of ASW Warhead Effectiveness Compendium (ASWWEC).
   f. (U) Continued development of Submarine Vulnerability Evaluation Model (SUBVEM) and Ship Vulnerability Model (SVM).

2. (U) FY 1991 PROGRAM:
   a. ( ) Continue TDs for
   b. ( ) Complete TWEAs for
   c. ( ) Complete TD and TWEA for a
   d. (U) Continue updating of ASWWEC, SVM and SUBVEM.

3. (U) FY 1992 PLANS:
   a. ( ) Complete TDs for
   b. ( ) Complete TDs for
   c. ( ) Complete TWEAs for
   d. ( ) Complete TWEAs for
   e. (U) Continue updating ASWWEC, SVM and SUBVEM.
   f. (U) Develop Ship Description and Vulnerability Data Base (SDV-DB).
   g. (U) Develop Component Vulnerable Area Table Data Base (CVAT-DB).

4. (U) FY 1993 PLANS:
   a. (U) Complete TDs and TWEAs for threat ships and submarines.
   b. (U) Continue updating ASWWEC, SVM and SUBVEM.
   c. (U) Continue development of SDV-DB and CVAT-DB.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVWPNCEN, China Lake, CA; NAVSWC, Dahlgren, VA; NAVSWC, White Oak, MD; and DTRC, Carderock, MD.

F. (U) RELATED ACTIVITIES: None.

G. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605152N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Studies and Analysis Support, Navy
PROJECT NUMBER: R2097 PROJECT TITLE: Manpower, Personnel, and Training Studies

C. (U) DESCRIPTION: The Chief of Naval Personnel has an ongoing need for direct analyses of Navy manpower, personnel, and training (MPT) policies and program planning. This project provides an essential management tool to: (a) assess the effectiveness of existing MPT programs, (b) identify needs for new programs, (c) determine required manpower and training mix relative to changing strategic and geopolitical factors, and (d) study the impact of MPT programs on Navy accession, retention, and performance. The program permits OPNAV to more effectively utilize MPT R&D expertise to respond to emerging MPT problems beyond Navy's control.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS: Not applicable.

2. (U) FY 1991 PROGRAM: Not applicable.

3. (U) FY 1992 PLANS:

a. (U) Identify ways to enhance integration of women members into combat roles in sub/surface and air assignments.

b. (U) Assess the feasibility of artificial intelligence applications for achieving optimal member-assignment fit with decreased headquarters manpower.

c. (U) Assess Navy manpower projection models to determine ways to produce rapid, more accurate "What-if" projections in support of manpower reduction initiatives.

d. (U) Study and analyze emergent problems affecting MPT policy and programs.

4. (U) FY 1993 PLANS:

a. (U) Conduct studies of Navy MPT policies and procedures across a broad range of issues -- such as, reducing first-term attrition among top performers, examining job-related educational requirements, studying ways to reduce PCS moves.

b. (U) Examine emergent job market and educational preparation factors affecting accession/retention of top Navy performers.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: CONTRACTORS: NTSC Orlando, FL; NPRDC San Diego, CA; NAVPGSCOL Monterey, CA; USNA Annapolis, MD; NOSC, San Diego, CA; NRL Washington, DC.

F. (U) RELATED ACTIVITIES: Program Elements: 0603720N, Education and Training; 0603707N, Manpower and Personnel Systems; 0604703N, Personnel, Training, and Human Factors; 0602234N AI Support.

G. (U) OTHER APPROPRIATION FUNDS: This is non-acquisition program.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605152N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Studies and Analysis Support, Navy
PROJECT NUMBER: W2092 PROJECT TITLE: Naval Aviation Studies

C. (U) DESCRIPTION: This project supports studies of a wide range of issues as a basis for the Assistant Chief of Naval Operations (Air Warfare) recommendations to the Chief of Naval Operations concerning major policy, planning, and acquisition program decisions. This effort is a management initiative (not a new start) which will allow accounting of study resources and allocate them in a timely manner according to priorities. This studies line will be an ongoing program as it would continue to fund studies on a broad range of issues such as future force structure, manning levels, and current operational readiness.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS: (funded elsewhere)
   a. (U) Completed 1990 Naval Aviation Plan support studies.
   b. (U) Initiated Carrier Air Wing Study 2010.
   c. (U) Initiated future CV design alternatives.
   d. (U) Initiated study on Naval Arms Control - the impact on Naval aviation.
2. (U) FY 1991 PROGRAM:
   a. (U) Complete 1991 Naval Aviation Plan.
   b. (U) Continue Carrier Air Wing Study 2010.
   c. (U) Initiate Performance Oriented Readiness Assessment (PORA).
   d. (U) Continue study on Naval Arms Control.
3. (U) FY 1992 PLANS:
   a. (U) Initiate aircrew and aircraft survivability improvement survey.
   b. (U) Initiate study to determine optimal replacement ratio of new technology aircraft, i.e., A-12 for A-6
4. (U) FY 1993 PLANS:
   a. (U) Continue aircrew and aircraft survivability improvement survey.
   b. (U) Continue study to determine optimal replacement ratio for new aircraft,i.e., NATF for F-14, ATS for E-2, S-3, EA-6B.
5. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NADC, Warminster, PA; NWC, China Lake, CA; NATC, Patuxent, MD. CONTRACTORS: Booz Allen Hamilton, Arlington, VA; KAPOS Associates, Arlington, VA; Center for Naval Analyses, Arlington, VA.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605153M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Operations Analysis Group, Center for Naval Analysis (MCOAG) (CNA)
PROJECT NUMBER: C0031 PROJECT TITLE: Marine Corps Operations Analysis

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TOTAL PROGRAM
C0031	MCOAG	4,580	4,531	4,157	4,521	CONT.

B. (U) DESCRIPTION: The CNA supports the Marine Corps Studies System (MCSS) by providing approximately twenty analyst man years for conducting operations research, systems analyses, and cost effectiveness studies in the areas of manpower utilization, equipment, tactics, weapons systems, operational tests, and field exercises.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Provided analytical support of the MCSS for more than twenty-three studies and analyses including: Command, Control, and Communications (C^3) Analysis, Expeditionary Combat Service Support, Advanced Amphibious Assault Program, Cost and Operational Effectiveness Analyses (COEAs), Unmanned Air Vehicle (UAV) Mixes in Support of the Marine Air-Ground Task Force Air Combat Element (MAGTF ACE), and Marine Corps Aviation Suppression of Enemy Air Defense (SEAD).

2. (U) FY 1991 Program: Provide analytical support to the MCSS by conducting COEAs, evaluations of doctrine/organization/tactics, studies concerning manpower and force structure issues, and support on the Middle East and Southwest Asia Operations.

3. (U) FY 1992 Plans: Continue to support, with approximately twenty analyst man years, the MCSS with COEAs and other analyses and studies as required.

4. (U) FY 1993 Plans: Continue to support, with approximately twenty analyst man years, the MCSS with COEAs and other analyses and studies as required.

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: Federally Funded Research and Development Contractor (FFRDC), Center for Naval Analysis, Indianapolis, IND. CONTRACTORS: NONE.

E. (U) RELATED ACTIVITIES: Program Element 0605151M, Studies and Analysis, Marine Corps.

F. (U) OTHER APPROPRIATION FUNDS: NONE.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE. UNCLASSIFIED

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0605154N **Budget Activity:** 6
Program Element Title: Center for Naval Analyses, Navy
Project Number: R0148 **Project Title:** Center for Naval Analyses, Navy

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0148	Center for Naval Analyses, Navy	27,529	26,084	24,321	26,679	Cont	Cont

B. (U) DESCRIPTION: The Center for Naval Analyses (CNA) is the Department of the Navy's only Federally Funded Research and Development Center. CNA provides independent, objective, and expert analyses based on its unique access to sensitive data and the hands-on exposure to fleet operations gained through its world-wide field program. Because of rapid advances in technology, changes in the fleet, the increasing complexity of weapon systems, and the pressure to cut budgets the Navy has a greater need for analyses that are both sophisticated and timely. CNA is uniquely qualified to meet that need. The Center conducts a wide range of projects ranging from on-site analyses for fleet commanders to improve tactics and readiness of existing forces to analyses for Navy headquarters decision-makers with responsibility for systems acquisition, program planning and budgeting, and manpower management. CNA's capabilities cover a broad range of research areas, including: (a) System testing and fleet employment; (b) Warfare capability assessment; (c) Strategy, plans, and operations; (d) Readiness and sustainability; (e) Logistics; (f) Warfare modeling; (g) Manpower and training; (h) System evaluation and acquisition; (i) Resource management; (j) Technology assessment; (k) Methodology development; (l) Tactical development and evaluation; and (m) Operational testing and evaluation. This broad range of analysis is primarily financed in this program element for that effort which is fundamental to maintaining the basic CNA analytic capabilities. CNA also performs other studies and analysis to include Marine Corps operational analysis and fleet tactics evaluation which are financed elsewhere.

(U) CNA's analyses have resulted in substantial improvements in fleet effectiveness and significant cost avoidance.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

2. (U) FY 1990 Accomplishments: In addition to the research areas noted above, CNA will continue to initiate efforts to address concerns of Congress and respond to legislation in areas such as Net Assessment, Operational test and evaluation, and warfare area appraisals, master plans, and investment strategies. Some specific examples of research areas are:

a. (U) Develop and apply methodology in support of net assessments, that reflect independent, accurate and objective comparisons of forces. Also develop and maintain an accurate data base to support net assessment.

PROGRAM ELEMENT: 0605154N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Center for Naval Analyses, Navy
PROJECT NUMBER: R0148 PROJECT TITLE: Center for Naval Analyses, Navy

b. (U) Develop and apply methodology in support of master plans, and investment strategies that allows clear rationale and justification for specific programs budgets, schedules and quantities and that provides basis for establishing funding priorities.

c. (U) Develop and refine criteria for use in selecting research and development programs, to ensure that these programs are affordable, technically feasible, appropriate to projected threats, and consistent with sound operational and tactical principles.

d. (U) Evaluations of new systems during operational testing, to ensure that scarce procurement funds are spent on programs that will perform as required.

e. (U) Develop and apply improved techniques for assessing the combat effectiveness of proposed weapon systems and for evaluating methods of improving fleet readiness and sustainability within budget constraints.

f. (U) Assessment of methods of recruiting, training, and retraining Navy personnel in the face of a declining manpower pool and increased demands for skilled personnel in the private sector.

g. (U) Provide an independent objective forum through which the senior leadership of the USN/USMC can benefit from expert non-governmental advice on complex and contentious issues.

h. (U) Execute a JCS mandated cost and operational effectiveness assessment of the proposed long-range conventional standoff weapon.

2. (U) FY 1991 Program: Address issues of major importance to the Navy's leadership in the research areas noted above, particularly in areas of interest to the Congress. CNA's research program is updated quarterly and specific studies conducted in FY 1991 will be identified at the start of each quarter. The frequent review of CNA's program ensures that it is coordinated with other Navy research and that it addresses critical, high-priority issues requiring CNA's innovative and objective approach. In the recent budgetary climate the Navy must rely even more on CNA in its effort to maximize effectiveness from available resources.

3. (U) FY 1992 Plans: As in FY 1991, CNA's research program will be updated each quarter to ensure CNA's research and studies support the Navy in efficient and effective manner.

4. (U) FY 1993 Plans: Same as 1992

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: CONTRACTOR: The Center for Naval Analyses, Alexandria, Virginia.

PROGRAM ELEMENT: 0605154N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Center for Naval Analyses, Navy
PROJECT NUMBER: R0148 PROJECT TITLE: Center for Naval Analyses, Navy

E. (U) COMPARISON WITH REVISED FY 1990/1991 PRESIDENT'S BUDGET:
1. (U) ENGINEERING CHANGES: Not applicable.
2. (U) SCHEDULE CHANGE: Not applicable.
3. (U) COST CHANGES: Not Applicable

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: Program Element 0605153M, Marine Corps Operations Analysis Group, Program Element 0605155N, Fleet Tactical Development and Evaluation, and Program Element 0605856N, Strategic Technical Support and other R&D and O&M programs dependent on customer requirements for studies and analysis.

H. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605155N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Fleet Tactical Development and Evaluation
PROJECT NUMBER: R0151 **PROJECT TITLE:** Fleet Tactical Development and Evaluation

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0151	Tactical Development and Evaluation	13,591	14,010	12,721	12,644	Cont.	Cont.

B. (U) DESCRIPTION: This Program Element supports all naval warfare task areas and provides technical and analytical support to develop and evaluate tactics during fleet operations and exercises. Results are new improved tactics for application in various mixes of force structures and weapon systems, i ıding newly introduced systems, in various threat scenarios and directly add to warfighting effectiveness.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS: With analysis support provided by this program, fleet commanders developed new tactics for:
   a. (U) SSN's executing Anti-Submarine Warfare (ASW) and Anti-Surface Warfare (ASUW) missions.
   b. (U) Coordinated Battle Group (BG) ASW.
   c. (U) Battleship BG operations.
   d. (U) Coordinated air and surface ASUW and strike warfare.
   e. (U) Anti-ship cruise missile targeting and countermeasures.
   f. (U) Torpedo defense.
   g. (U) AAW.
   h. (U) Refined Tactical Decision Aids (TDA) and Fleet Mission Program Library (FMPL) software for desk-top and hand-held computers.

2. (U) FY 1991 PROGRAM: Develop new advanced tactics to include (but not limited to):
   a. (U) Over The Horizon-Targeting(OTH-T)/Cruise missile employment
   b. (U) EA-6B C3CM communications jamming.
   c. (U) ASW operations against modern submarines.
   d. (U) Submarine employment in coordinated operations.
   e. (U) SSN capabilities in low-intensity conflict.
   f. (U) ISAR employment in battle group ASW operations.
   g. (U) Counter mine warfare.
   h. (U) Refine/develop TDA/FMPL software for desk-top and hand-held computers.
   i. (U) Develop/refine architecture for Navy Lessons Learned (NLL) system.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605155N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Fleet Tactical Development and Evaluation
PROJECT NUMBER: R0151 PROJECT TITLE: Fleet Tactical Development and Evaluation

3. (U) FY 1992 PLANS: As determined by the TAC D&E Steering Committee, continue near-term efforts to correct tactical deficiencies identified through fleet operations and exercises.
   a. (U) Increase emphasis on developing and evaluating tactics as warfighting multipliers.
   b. (U) Analyze exercise results to assess fleet tactical performance and identify tactical lessons and tactical deficiencies.
   c. (U) Respond to future tactical development needs to keep pace with rapidly changing tactical scenario.
   d. (U) Continue to refine TDA/FMPL for desk-top and hand-held computers to enhance fleet commanders' utilization of warfighting resources.
   e. (U) Continue to develop/refine NLL system.
4. (U) FY 1993 PLANS: Same as FY 1992 Plans above.
5. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVTACSUPPACT, Silver Spring, MD; COMOPTEVFOR, Norfolk, VA.; NWACC, Corona, CA; United States Naval Academy, Annapolis, MD; various Naval laboratories. CONTRACTORS: DELEX, Inc., Tyson's Corner, VA; CNA, Alexandria, VA; OMNI Analysis Inc., Norfolk, VA; Analysis and Technology, Stonington, CT; Summit Research Corp, Gaithersburg, MD.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
1. (U) Technology Changes: none
2. (U) Schedule Changes: none
3. (U) Cost Changes: none

F. (U) PROGRAM DOCUMENTATION: Not Applicable.

G. (U) RELATED ACTIVITIES: Program Element 0603711N, Tactics Development Support. Provides data collection and analysis, and exercise reconstruction in support of tactics evaluation and tactical deficiency identification efforts.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605156M BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Marine Corps Operational Test and Evaluation
PROJECT NUMBER: C0033 PROJECT TITLE: Operational Test and Evaluation Support (OT&E)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY1991 ESTIMATE	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C0033	OT&E	837	955	5,000	1,877	CONT.	CONT.

B. (U) DESCRIPTION: Supports Marine Corps Operational Test and Evaluation Activity (MCOTEA) representatives for Marine Corps OT&E and OT&E performed by Fleet Marine Force Commanders and Technical Support Activities. Provides separate funds for OT&E of systems for procurement by the Marine Corps to include test planning, operational testing, and independent evaluation report preparation.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Participated in joint OT&E of NAVSTAR. Initiated plans for OT&E of Lightweight 155mm Howitzer.

2. (U) FY 1991 Program: Complete OT&E of Lightweight 155mm Howitzer and publish Independent Evaluation Review (IER). Conduct OT&E on Assault Amphibious Vehicle Mine Plow (AAVMP), Anti Personnel Obstacle Breaching System (APOBS), Logistics Operation (LO), Single Channel Ground-Air Radio System (SINCGARS), Lightweight Early Warning Detection Device (LEWDD), STINGER Night Sight, Tactical Air Operations Module (TAOM) and FOT&E on TAOM and publish IERs. Write test plans for Surf Zone Mine Clearing System (CATFAE), Advanced Tactical Air Command Central (ATACC) and Anti-Armor Weapons System-Medium (AAWS-M).

3. (U) FY 1992 Plans: Conduct OT&E on ATACC and AAWS-M and publish IERs. Conduct OT&E on CATFAE. Write test plans for Light Armored Vehicle-105 (LAV-105). Conduct OT&E on Light Armored Vehicle - Air Defense (LAV-AD).

4. (U) FY 1993 Plans: Complete OT&E on CATFAE, conduct OT&E of LAV-105, and publish IERs.

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: MCOTEA and MCRDAC, Quantico, VA and various service laboratories. CONTRACTORS: NONE.

E. (U) RELATED ACTIVITIES: NONE.

F. (U) OTHER APPROPRIATION FUNDS: NONE.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE. UNCLASSIFIED

FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY
PROGRAM ELEMENT: 0605803N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Electromagnetic (EM) Effects and Spectrum Control
PROJECT NUMBER: X0706 PROJECT TITLE: Electromagnetic Spec Management

A. (U) RESOURCES: (Dollars in Thousands)

FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE CONT.	TOTAL PROGRAM CONT.
3,399	3,622	3,658	3,717		

B. (U) DESCRIPTION: This project develops advanced technology to identify and eliminate Electromagnetic Interference (EMI) sources from Navy systems and platforms.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

a. (U) Developed Navy gray paint that reduces corrosion and has good electromagnetic compatibility (EMC) characteristics.

b. (U) Developed criteria and methodology to be used in the Battle Force (BF) EMI Evaluation System (BEES) to quantify the effect of EMI on the combat effectiveness of Navy systems.

c. (U) Began developing a Prototype Communications Planning and Administrative Support System (COMPASS) to be used by the Fleet to provide user feedback for use in the continuing development of the Force Level Frequency Management Program (FLFMP).

d. (U) Continued developing self-activating blankers and advanced signal processing techniques to immunize radar receivers to EMI.

2. (U) FY 1991 Program:

a. (U) Develop a BEES Library of the specific scenarios of interest performed in a non-EMI environment.

b. (U) Develop the capability in BEES to eliminate the man-in-the-loop by using Artificial Intelligence (AI)/Expert System (ES) techniques to develop decision trees and isolate the effects of EMI on operational tactics.

c. (U) Continue development of the FLFMP by expanding the capability of the EMC Analysis Program (EMCAP) to include more radars; additional platforms; and, completing the development of the COMPASS Prototype for Fleet use and operational feedback.

d. (U) Investigating promising fiber optics technology to improve Navy EMC.

e. (U) Investigating the applicability of the Waveform Recording and Playback System (WRAPS) to replicate the BG Electromagnetic Environment (EME) for operational testing.

3. (U) FY 1992 Plans:

a. (U) Continue the development of the BEES Library, EMI Models, and AI/ES Decision Trees to provide the Navy a management analysis tool that quantifies the impact of EMI on force level combat effectiveness.

b. (U) Continue development of the FLFMP by incorporating Navy feedback into COMPASS and EMCAP Expansion.

c. (U) Evaluate promising fiber optics technology applications and apply them to selected equipment and evaluate their impact on EMI control.

d. (U) Apply WRAPS to specific BG scenarios to verify the authenticity of the digital signals for interplatform EMI analysis applications.

4. (U) FY 1993 Plans:

a. (U) Continue development of the FLFMP.

PROGRAM ELEMENT: 0605803N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Electromagnetic (EM) Effects and Spectrum Control
PROJECT NUMBER: X0706 PROJECT TITLE: Electromagnetic Spec Management

b. (U) Develop criteria to evaluate and complete the application of AI/ES to develop a Library of scenarios with accompanying decision trees that eliminate the man-in-the-loop and thereby isolate EMI effects so that BEES analysis will accurately assess the impact of EMI on force level warfighting capability.

c. (U) Continue to apply fiber optics technology to control EMI.

d. (U) Continue to develop WRAPS to provide authentic signal match of BG EME.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSWC, Dahlgren and White Oak, VA; NAVOCEANSYSCEN, San Diego, CA; NRL, Washington, DC; and ECAC, Annapolis, MD.

E. (U) RELATED ACTIVITIES: None.

F. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605804N Budget Activity: 6
PROJECT ELEMENT TITLE: Technical Information Services
PROJECT NUMBER: R0835 PROJECT TITLE: Technical Information Services

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0835	Technical Information Services	2833	2935	2741	3312	Cont.	Cont.

B. (U) DESCRIPTION: This element influences, through evaluation and feedback by Navy scientists and engineers, the $5 billion industry investment in Independent Research and Development (IR&D), and supports Navy dissemination of IR&D benefits. Public Law 91-441 requires companies to present IR&D programs for technical evaluation; results are used to set ceilings that limit cost reimbursement by DOD. The effort identifies technological gaps IR&D projects could address, and supports interactions to multiply benefits of industry efforts. The project supports transfer of Navy technology to business and local governments for civil use according to statutes, government policy, and executive order--Public Law 96-480, OMB Circular A-109, Federal Technology Transfer Act of 1986--through Navy Acquisition Research and Development Information Centers; Navy technology publications; domestic technology transfer; review of patents/inventions for potential licensing; offices for research and technology assistance; promotion of cooperative R&D agreements.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS: Navy assigned IR&D companies increased to 150. IR&D database use expanded and simplified. Technology TransFair held. Fifteen (15) Cooperative R&D Agreements (CRDAs) signed.

2. (U) FY 1991 PROGRAM: Implement two-year IR&D reporting/review cycle. Increase on-site visits by 50%. Promote technology transfer by increasing CRDAs; publicizing patents. Administer delegation of CRDA authority.

3. (U) FY 1992 PLANS: Implement 2-year cycle for other half of IR&D companies. Visit foreign sites. Standardize/computerize all scoring and reporting. Promote linked databases for tech transfer with industry.

4. (U) FY 1993 PLANS: Refine 2-year cycle process. Group site visits. Review scoring process. Increase use of IR&D database in same year. Set up tech transfer gateways systems. Complete delegation of CRDA authority.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NOSC, San Diego, CA; DTRC, Bethesda, MD; NSWC, Dahlgren, VA; NUSC, New London, CT; and NWC, China Lake, CA. CONTRACTORS: Not Applicable.

E. (U) RELATED ACTIVITIES: Navy efforts coordinated/conducted with Army and Air Force. Policy guidance from the Under Secretary of Defense (Acquisition.)
F. (U) OTHER APPROPRIATION FUNDS: Not applicable.
G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605853N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Management and Technical Support

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0231	ASW System Support	3,368	4,081	4,603	4,780	Cont	Cont
R0905	Naval Warfare Tactical Analysis	3,471	3,181	3,643	3,689	Cont	Cont
R1767	NWC Center for Naval Warfare	1,249	1,166	1,437	1,488	Cont	Cont
X1795	Countermeasures and Assessment System *	0	0	2,603 *	3,337	Cont	Cont
	TOTAL	8,088	8,428	12,286	13,294		

* Formerly C3CM DECISION AID SYSTEM in PE 0604270N/X1795

B. (U) BRIEF DESCRIPTION OF PROGRAM ELEMENT: This program provides analytical and management support to the Planning and Programming segments of the PPBS process. The program element is comprised of four projects which affect the development of annual warfighting appraisals of each Warfare Task Area as well as support activities of the Center for Naval Warfare Studies at the War College. Funding provides hardware and software, including future enhancements of both, in support of computer models which are necessary to collect performance data and measure system performance/effectiveness leading to rational cost/performance tradeoff recommendations; provides for the analyses that underpin the development of annual warfighting appraisals of each Naval Warfare Task area including a summary warfare appraisal that integrates the individual warfare task.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605853N **BUDGET ACTIVITY:** 6
PROGRAM ELEMENT TITLE: Management and Technical Support
PROJECT NUMBER: R0231 **PROJECT TITLE:** ASW Systems Support

C. (U) DESCRIPTION: The project develops and reviews Navy's ASW Investment Strategy. Analyses are conducted to define ASW requirements, assess ASW programs and performance, and make cost/performance tradeoffs among ASW system concepts. Efforts support definition of warfare requirements and development of ASW architectures.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:

a. (U) Continued ASW model maintenance and modifications.

b. (U) Continued annual analysis in support of ASW Master Plan.

c. (U) Completed development of top level models incorporating C^3/C^3CM models.

d. (U) Incorporated national sensors in campaign level models.

e. (U) Completed second interim report of ASW Future Naval Force Requirements Study (Pacific Scenario).

f. (U) Completed nine ASW System Performance studies in both LIC and GCW scenarios.

g. (U) Completed analysis in support of ASW Appraisal Issues.

2. (U) FY 1991 PROGRAM: Perform annual ASW Master Plan and architectural option analyses with emphasis on third world threats. Initiate associated modeling improvements. Initiate an ASW Model Maintenance and Configuration Control program with technical direction provided by CNA. Perform third interim report of ASW Future Naval Force Requirements Study (Low Intensity Conflict (LIC scenarios)) system engineering studies for both LIC and Global Conventional War (GCW) scenarios.

3. (U) FY 1992 PLANS: Continue all efforts as in 1991 program.

4. (U) FY 1993 PLANS: Continue all efforts as in 1992 program.

5. (U) PROGRAM TO COMPLETION: Continuing efforts to support Master Plan development, conduct warfighting effectiveness estimates and support architectural development efforts. In conjunction with CNA, provide an ASW Model and Configuration Program to provide credible source of ASW models with supporting documentation.

E. (U) WORK PERFORMED BY: IN-HOUSE: NUSC, Newport, RI, NAVOCEANSYSCEN, San Diego, CA. CONTRACTORS: CNA, Alexandria, VA; Systems Planning and Analysis, Arlington, VA.
F. (U) RELATED ACTIVITIES: Supports all ASW Naval warfare efforts.
G. (U) OTHER APPROPRIATION FUNDS: None, this is a non-aquisition program.
H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605853N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Management and Technical Support
PROJECT NUMBER: R0905 PROJECT TITLE: Naval Warfare Tactical Analysis

C. (U) DESCRIPTION: The project provides analytical and management support to the DCNO (Naval Warfare) as Warfare Task Sponsor for Anti-Sub Warfare (ASW), Anti- Air Warfare (AAW), STRIKE WARFARE (STK), Anti-Surface Warfare (ASUW), C^3I, EW, Amphibious, Mine, Chemical, Strategic, Space, and Special Warfare. The project conducts continuing analyses of Navy's capabilities and limitations in execution of these missions. Master plans are developed as blueprints for defining problems and requirements for the next Defense Program in each Warfare Task. A Summary Warfare Appraisal integrates all individual Warfare Task Appraisals.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS: Continued Support for Project OSPREY REINDEER; conducted warfare task appraisals in ASW and Space; developed/ updated master plans in MINE WARFARE (MIW), Mine Counter Measure (MCM), Anti-Air Warfare (AAW), and C^3I; began development of Cover and Deception requirements for all warfare task area master plans; and commenced baseline ATS requirements definition.

2. (U) FY 1991 PROGRAM: Continue annual appraisals in all warfare task areas and support for OSPREY REINDEER. Continued major master plan updates at the rate of one to three warfare tasks per year. Begin incorporating C&D requirements in master plan. Fully integrate warfighting impact analyses as a major element of tradeoff decision.

3. (U) FY 1992 PLANS: Continue all efforts as in FY 1991.

4. (U) FY 1993 PLANS: Continue all efforts as in FY 1992.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVOCEANSYSCEN, San Diego, CA; NAVCOASTSYSCEN, Panama City, FL; COMINEWARCOM, Charleston, SC; NAVSWS, Dahlgren, VA; NRL, Washington, DC; NAVAIRDEVCEN, Warminster, PA. CONTRACTORS: The Aerospace Corporation, El Segundo, CA; System Planning and Analysis, Arlington, VA; Science Application International Corp., McLean, VA.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605853N **BUDGET ACTIVITY:** 6
PROGRAM ELEMENT TITLE: Management and Technical Support
PROJECT NUMBER: R1767 **PROJECT TITLE:** NWC Center for Naval Warfare

C. (U) DESCRIPTION: The project analyzes overall Naval Strategy and provides recommendations to CNO and fleet commanders for improvements in both strategy and means of strategy execution. This effort uniquely joins strategic and tactical concepts and tests the integrated concepts through wargaming. Objectives of the effort are to provide improvement in visibility of missions and roles of fleet forces and generate Naval strategy and campaign alternatives.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS: Provided support to CNO Strategic Studies Group (SSG) at planned levels and support to the Center for Naval Warfare Studies (CNWS). Provided campaign option support in response to CNO and Fleet tasking in the context of global war and regional crises and contingencies. Assessed the impact on force structure and strategy of global economic trends and arms agreements. Conducted the second Global War Game in the second five year series. Established coordination between strategy and technology through integration of emerging technologies into wargame application and research. Continued multilateral programs and intelligence support to maritime campaigns.

2. (U) FY 1991 PROGRAMS: Commence the third Global War Game in the second five year series. Continue support of SSG and CNWS programs, provide campaign option support, continue development of strategy/technology coordination, support multilateral programs and maritime campaigns. Assess the use of military in drug intervention.

3. (U) FY 1992 PLANS: Conduct year four of the five year annual Global War Game series. Continue all other FY 1991 activity.

4. (U) FY 1993 PLANS: Conduct year five of the five year annual Global War Games series. Continue all other FY 1991 activity.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVWARCOL, Newport, RI. CONTRACTORS: Sonalysts, Inc., Waterford, CT.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1992 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605853N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: MANAGEMENT & TECH SUPPORT
PROJECT NUMBER: X1795 PROJECT TITLE: C^3CM DECISION AID SYS

C. ( ) DESCRIPTION: Command, Control and Communications Countermeasures (C^3CM) Assessment Simulator (CMAS) is a unique large scale, high resolution, real time, C^3CM simulation and analysis system that simulates, in fine detail, analytical cases ranging from . CMAS provides an interactive C^3CM operational analysis to assess effectiveness of systems under development, perform architecture assessments, and support tactics development and evaluation which are not amenable to wargaming and exercises due to restrictions.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. ( ) FY 1990 ACCOMPLISHMENT: Completed model and

Ongoing tasks include:

2. ( ) FY 1991 PROGRAM: Continue coding and documentation. Support development of: warfare appraisals; decision aids for Battle Group Space and Electronic warfare

Conduct an operational assessment for USCINCSPACE. Initiate Navy Tactical Command Systems Afloat (NTCS-A)

3. ( ) FY 1992 PLANS: Commence updates to CMAS to support enhanced capabilities meeting expanded operational requirements. Continue coding and documentation as necessary. Continue to support the development of: warfare appraisals; decision aids for Battle Group Space and Electronic warfare

4. ( ) FY 1993 PLANS: Incorporate software/hardware system enhancements to keep pace with model requirements and improve post analysis capabilities. Expand data base capacity.
Continue to support as described in paragraph 3.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: NAVOCEANSYSCEN, San Diego, Ca.

F. (U) RELATED ACTIVITIES: None.

G. (U) OTHER APPROPRIATION FUNDS: THIS IS A NON-ACQUISITION PROGRAM.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605856N BUDGET ACTIVITY: 3-Strategic Programs
PROGRAM ELEMENT TITLE: Strategic Technical Support

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
M0100	Biomedical Support for Submarine Systems	1,167	1,225	1,240	1,450	Cont.	Cont.
R0128	Management and Technical Support, Strategic	4,025	3,602	4,842	5,215	Cont.	Cont.
T1038	Acoustic and Non-Acoustic Analysis Support	730	1,205	1,340	1,439	Cont.	Cont.
	TOTAL	5,922	6,032	7,422	8,104		

B. (U) DESCRIPTION:

1. (U) M0100 Biomedical Support for Submarine Systems - Provides biomedical knowledge necessary to increase effectiveness and enhance performance of critical submarine tasks with particular emphasis on development and assessment of improved visual and auditory sonar techniques to improve the operator's ability to detect, track and classify multiple targets. Recent rapid improvements in enemy operational capabilities now require reestablishment of this project to obtain maximum performance from all components of submarine sonar systems.

2. (U) R0128 Management and Technical Support, Strategic - Develops strategic and theater nuclear concepts, determines technology requirements, defines systems and options, evaluates system mixes, evaluates and establishes requirements for strategic force survivability against anti-submarine and anti-ballistic missile threats, conducts Sea Launched Ballistic Missile/Sea Launched Cruise Missile targeting application and deployment studies, examines reentry system requirements in support of sea-based strategic and theater nuclear systems, and establishes Navy Strategic Command, Control and Communications requirements. It includes assessment of future strategic and technology environments, the implications of that environment on national security policy, grand national strategy, maritime strategy, and consequential force requirements and employment policies for strategic forces. This project provides unique support necessary to produce optimum future naval contributions to strategic and theater nuclear forces.

3. (U) T1038 Acoustic and Non-Acoustic Analysis Support - Provides analysis of acoustic and non-acoustic data for ASW systems. Analyses are provided by Naval Intelligence Support Center (NISC) to exploit specific submarine characteristics by revised tactics or new ASW Systems.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605856N BUDGET ACTIVITY: 3-Strategic Programs
PROGRAM ELEMENT TITLE: Strategic Technical Support
PROJECT NUMBER: M0100 PROJECT TITLE: Biomedical Support Submarine Systems

C. (U) DESCRIPTION: This project increases effectiveness and enhances performance of critical submarine tasks. The project upgrades target acquisition, identification, and tracking capabilities to maximize effectiveness of defensive and offensive systems. Also, man-machine interface in auditory and visual systems will be evaluated concentrating on improved accuracy, speed, and efficiency to detect, classify and identify multiple targets. Emphasis is on assessing and developing new visual and auditory techniques that improve operator skills.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS: Reported optimal saturation and brightness for Navy Tactical Data System (NTDS) coding of visual displays. Determined detection and classification thresholds for analog vs. digitized modifications of contact signals. Determined effect on target detection of various ways to display background noise.

2. (U) FY 1991 PROGRAM: Determine output limiting parameters that least degrade operator performance. Determine optimal temporally and spectrally based signal processing techniques for improved detection, classification and tracking. Determine the effect of color names on cognitive sonar task performance. Determine waterfall display performance effects of 1, 2, and 3 bit quantization of background noise. Evaluate new sonar headsets. Report filter bandwidth effects on binaural enhancement. Report at-sea test results of binaural display technique.

3. (U) FY 1992 PLANS: Develop the Authorized Medical Allowance List (AMAL) for submarines to provide contingency treatment of serious non-crewmember casualties; appropriate noise level criteria for submarine berthing spaces to permit recovery from noise induced auditory threshold shifts incurred while on duty and prevent degraded performance of aural tasks.

4. (U) FY 1993 PLANS: Determine effect of color coded Cathode Ray Tube (CRT) displays in the control room on the night vision of the periscope operator.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVSUBMEDRSCHLAB, New London, CT. CONTRACTOR: None.

F. (U) RELATED ACTIVITIES: None.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1992 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605856N BUDGET ACTIVITY: 3-Strategic Programs
TITLE: Strategic Technical Support
PROJECT NUMBER: R0128 PROJECT TITLE: Mgmt and Tech Support, Strategy

C. (U) DESCRIPTION: Analytical support to CNO, SECNAV, JCS, and OSD in evaluation of strategic and theater nuclear issues within Navy program and overall balance within strategic forces. Evaluation of force capabilities and requirements, analysis of systems under development, trade-off analysis, and future national policy and strategy.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS: Trade-off analysis of system mixes and reduction in forces due to arms limitations negotiations. Trade-off analysis relating to weapons warhead mix. Wargame seminars training senior staff in nuclear implementation procedures. Conducted analysis of Strategic Integrated Operations Plan (SIOP) 6F. Assisted the Joint Staff in work-up for SIOP/RISOP wargaming. Studied optimization of special nuclear resources. SSBN security studies. Developed program to determine cost effective force. Continued analysis of weapon systems requirements related to relocatable reagents. Strategic Policy Analysis Group (SPAG) to provide broad-based examinations of strategic issues on a continuing basis. Continued work on STRATPLAN 2010, a long range planning process designed to assist Navy decision makers on strategic issues.

2. (U) FY 1991 PROGRAM: Continue to assess trade-offs relating to weapon configuration, targeting policy, ASW threat and operational requirements for current and future sea-based strategic and strategic related nuclear forces and C3I assets; Strategic Policy Analysis Group effort. Evaluate sea-based strategic and strategic related nuclear forces.

3. (U) FY 1992 PLANS: Continue: as in 1991. Increased funding requirements due to assumption of total responsibility for SPAG funding by OP-65.

4. (U) FY 1993 Plans: Continue: as in 1992.

5. (U) PROGRAM TO COMPLETION: This is a continuing process.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVSWC; Dahlgren, VA., Center for Naval Analysis; Washington DC. CONTRACTORS: Academy for Interscience Methodology; Rockville, MD., Mitre Corporation; Vienna, VA., Science Application International Corporation; McClean, VA., Johns Hopkins University/Applied Physics Laboratory; Washington DC.

F. (U) RELATED ACTIVITIES: PE 0603311F, Advanced Strategic Missile Systems (technology exchange); PE 0101221N, Fleet Ballistic Missile System; PE 0101228N, Trident; PE 0604363N, Trident II; PE 0605864F, Test and Evaluation.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1992 RDT&E, NAVY DESCRIPTIVE SUMMARY
PROGRAM ELEMENT: 0605856N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: Strategic Technical Support
PROJECT NUMBER: T1038 PROJECT TITLE: Acoustic and Non-Acoustic Analysis Support

C. ( ) DESCRIPTION: Provides for research and development of new data collection and analysis techniques in support of sensor and weapons system development; supports development of effective ASW tactics and 'through technical analysis of operational scenarios; provides unique hardward and software development at the Naval Technical Intelligence Center (NTIC).

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. ( ) FY 1990 ACCOMPLISHMENTS: Continued: research in nontraditional characterization, in association with the David Taylor Research Center, to provide insight to source origin mechanisms; support for Commenced: implementation of a architecture for acoustic signal processing with the Fixed Distributed System (FDS) to support new beamforming techniques for processing data from FDS and Surveillence Towed Array Sonar System (SURTASS); development on the Enhanced Multi Segment Track (EMST) introducing new equipment compatible with digital architecture; technical analysis of systems. Completed: implementation of new propagation loss models for use in measurement, improving our ability to derive SPL information from a wider variety of acoustic conditions.

2. ( ) FY 1991 PROGRAM: Continue: development of the processing system to support the planned first deployment of BSY-1 (digital) equipped submarine all other on-going projects. Commence: development of modeling efforts and analysis techniques to quantify system performance and predict Complete: development of the Enhanced Multi Segment Track (EMST) tool.

3. ( ) FY 1992 PLANS: Continue: on-going projects. Commence: integration of Complete: implementation of new propagation loss models for use in

4. ( ) FY 1993 PLANS: Continue: on-going projects. Complete: development of the integration of hardware and software for processing.

5. (U) PROGRAM TO COMPLETION: This is a continuing process.

E. (U) WORK PERFORMED BY: IN-HOUSE: NTIC; Suitland, MD., DTRC; Carderock, MD., NOSC; San Diego, CA., NUSC; New London CT. CONTRACTORS: ESL Inc. Applied Physics Laboratory/University of Washington, Planning Systems Inc; Sunnyvale, CA.,

F. (U) RELATED ACTIVITIES: PE 0604784N - Fixed Distributed System (FDS); PE 0204311N - Integrated Undersea Surveillance System; PE 0204313N - Surveillance Towed Array Sensor System.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. ( ) INTERNATIONAL COOPERATIVE AGREEMENTS: DEA 400 - IEP-22-

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0605857N **Budget Activity:** 6
Program Element Title: International RDT&E

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	Total Program
R0115	Supreme Allied Commander Atlantic, Undersea Research Centre (SACLANTCEN)	1,242	1,242	635	1,703	Cont.	Cont.
R0149	International Cooperative RDT&E	1,636	1,636	2,575	3,145	Cont.	Cont.
	TOTAL	2,878	2,870	3,210	4,848	Cont.	Cont.

B. (U) DESCRIPTION: Provides program management, execution and support (including travel) to implement a broad range of cooperative naval R&D initiatives with allied and friendly nations. Based on Congressional and OSD mandates, DoN's International RDT&E program provides for execution of DoN's cooperative R&D efforts. The objectives of DoN's international RDT&E effort are: support achievement of U.S. national security objectives by enhancing U.S. and allied weapon system interoperability and standardization; obtain useful allied technology which can be integrated into DoN RDT&E programs; reduce DoN RDT&E expenditures by sharing R&D costs with allies, and/or testing and evaluation of allied defense equipment resulting in a Non-Development Item (NDI) procurement. Congressional guidance includes Title 22, U.S.C., Section 2767, "Cooperative Projects with Friendly Foreign Countries". Specific International RDT&E projects efforts conducted to accomplish these objectives are: development and negotiation of DoN R&D international Memoranda of Understanding (MOUs) required to implement cooperative R&D projects with allied and friendly nations (25 MOUs); management of DoN's Foreign Comparative Test (FCT) program efforts (30 active FCT projects); management of DoN's bilateral and multilateral information exchange programs with allied and friendly nations (200 agreements); management of DoN's Scientist/Engineer Exchange Program efforts, including language training for U.S. participants (approximately 40 U.S./allied personnel); and participation in DoD directed armaments cooperation fora such as Conference of NATO Armaments Directors (CNAD) groups (including the NATO Naval Armaments Group), Senior National Representative (SNR) consultation, and The Technical Cooperation Program (TTCP). This project also provides for the salaries and administrative cost to maintain the U.S. scientific staff assigned to the Supreme Allied Commander Atlantic, Undersea Research Centre (SACLANTCEN) La Spezia, Italy. Additionally, it supports collaboration between U.S./SACLANTCEN scientists and for lease/loan/purpose of equipment and expendables to support the Centre's scientific program.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605857N **BUDGET ACTIVITY:** 6
PROGRAM ELEMENT TITLE: International RDT&E
PROJECT NUMBER: R0115 **PROJECT TITLE:** Supreme Allied Commander Atlantic Undersea Research Centre (SACLANTCEN)

C. (U) DESCRIPTION: This project provides for salary and administrative costs for U.S. Navy scientists at NATO Supreme Allied Commander Atlantic Undersea Research Centre (SACLANTCEN), La Spezia, Italy. It also provides for all U.S. direct support to SACLANTCAN for administering requests for equipment, other assets, services and to foster collaboration between USN and SACLANTCEN scientists. The Centre's unique research facilities and reservoir of oceanographic/acoustic data bases and knowledge are used to augment and complement ASW-related research.

D. (U) PROJECT ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS: Supported scientific collaboration in area of ocean acoustics, ocean/acoustics numerical modelling, and seafloor studies. Provided expendable devices and ocean measurement equipment.

2. (U) FY 1991 PROGRAM: Continuation of FY 1990 activities. Commence development of ocean prediction model for Mediterranean Sea, and acoustic reverberation program in North Atlantic.

3. (U) FY 1992 PLANS: Continuation of FY 1991 program. Increase levels of effort in acoustic reverberation and Mediterranean Sea Model.

4. (U) FY 1993 PLANS: Continuation of FY 1992 effort relating to ASW and Mine Counter Measures (MCM).

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NOARL, Stennis Space Center, MS.; NUSC, New London, CT; OCNR, Arlington, VA; SACLANTCEN, La Spezia, Italy; SPCC, Mechanicsburg, PA. CONTRACTORS: Woods Hole Oceanographic Institution, Woods Hole, MA.

F. (U) RELATED ACTIVITIES: PE 0601153N - Defense Research Science; PE 0602435N - Ocean and Atmospheric Support Tech; PE 0603207N - Air/Ocean Tactical Applications; PE 0603704N - ASW Oceanography; PE 0603785 - ASW Environmental Acoustic Support.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NATO SACLANT ASW Research Centre Chapter 31 Oct 1962.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0605857N **Budget Activity:** 6
Program Element Title: International RDT&E
Project Number: R0149 **Project Title:** International Cooperative RDT&E

C. (U) PROJECT DESCRIPTION: International RDT&E project efforts include: development/negotiation of DoN R&D international MOUs required to implement cooperative R&D projects (25 MOUs); management of DoN's FCT program efforts (30 active FCT projects); management of DoN's bilateral and multilateral information exchange programs (200 agreements); management of DoN's Scientist/Engineering Exchange Program (SEEP) efforts, including language training for U.S. participants (40 U.S./allied personnel); and participation in DoD directed armaments cooperation fora such as Conference of NATO Armaments directors (CNAD) groups and The Technical cooperation Program (TTCP).

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS: Plan for FY 1992/3 is to implement the ASN(RDA) and DASN (International Policy) guidance on management of international RDT&E efforts.

1. (U) FY 1990 ACCOMPLISHMENTS: Developed and negotiated 11 R&D cooperative project MOU's with allied and friendly nations. Completed 5 FCT projects with allied nations. Conducted comprehensive review of 200 existing information exchange agreements to ensure DoN's objectives of obtaining foreign technology is being achieved.

2. (U) FY 1991 PROGRAM: Target R&D cooperative project MOU effort to focus on "high leverage DoN R&D programs. Target information exchange efforts to focus on "high leverage" agreement complementing DoN R&D programs.

3. (U) FY 1992 PLANS: Develop and negotiate "high leverage" R&D cooperative project MOU's. Enhance linkage between domestic DoN technology objectives and DoN international RDT&E efforts.

4. (U) FY 1993 PLANS: Continue FY 1991/92 plans.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVORDSTA,Indian Head, MD; CONTRACTORS: Crosspaths, Arlington, VA, Booz Allen, Arlington, VA

F. (U) RELATED ACTIVITIES: OSD provides project funding on the following: PE 0605130D, Foreign Cooperative Testing; and PE 0603790D, Nunn Armaments Cooperation.

G. (U) OTHER APPROPRIATED FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Effort includes development/negotiation of all DoN R&D international MOUs required to implement cooperative R&D projects. Funding is not project specific.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605861N **BUDGET ACTIVITY:** 6
PROGRAM ELEMENT TITLE: RDT&E,N Science and Technology Management

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0135	OCNR Science and Technology Management	45,063	46,006	48,882	56,324	Cont.	Cont.
R1855	Science/Engineering Training Support	533	527	550	947	Cont.	Cont.
M0104	NAVMED Management Support	6,601	6,608	7,453	8,402	Cont.	Cont.
X0832	DNL Management Support	1,585	1,370	1,458	2,677	Cont.	Cont.
	TOTAL	53,782	54,511	58,343	68,350	Cont.	Cont.

B. (U) DESCRIPTION: This program supports the Office of the Chief of Naval Research, small non-overhead distributing Navy R&D activities, and Medical Research Units. It pays salaries, rent, utilities, printing, supplies, materials, and other day-to-day costs that are necessary to support these Navy activities that administer and execute the Navy's R&D program. The vast majority of these costs are fixed costs which primarily support scientists and engineers managing and executing the Navy Science and Technology Program. For overhead distributing activities, this program covers costs not chargeable to overhead or to customers such as base closure and severance pay costs.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605861N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: RDT&E,N Science and Technology Management
PROJECT NUMBER: R0135 PROJECT TITLE: OCNR Science and Technology Management

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0135	OCNR Science and Technology Management	45,063	46,006	48,882	56,324	Cont.	Cont.

B. (U) DESCRIPTION: This project supports the Navy's entire Science and Technology mission. OCNR directs and manages scientific advances which benefit all Navy mission areas, including anti-submarine warfare and anti-air warfare, and supports the fleet's ability to operate from a position of technological superiority. OCNR provides management and direction for the entire Navy Science and Technology program. Functions performed include: (1) Scientific and technical direction of the nationwide Category 6.1 basic research program with colleges, universities, and Navy laboratories; (2) scientific and technical direction of the 6.2 exploratory development program through the Navy's R&D laboratories and centers, as well as with industry; (3) management and formulation of the Navy Advanced Technology Demonstration program (Category 6.3A) executed in industry and with Navy laboratories and centers; (4) management, resource formulation, program assessment and contract negotiation/administration of the entire Navy basic research and exploratory development program; (5) program management and administrative support to selected research programs of SDIO, DARPA, CNO, and SBIR; (6) coordination of the Navy's Tech Base program within the context of total DoD/Government (i.e., National Science Foundation, National Academy of Sciences) R&D initiatives in order to obtain maximum scientific advances. This project funds salaries, rent, utilities, supplies and other fixed costs at OCNR Headquarters and field offices.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS

1. (U) FY 1990 ACCOMPLISHMENTS: This project funded basic costs at OCNR headquarters, the ONR European Office (London), the ONR Asian Office (Tokyo), and field detachments.

PROGRAM ELEMENT: 0605861N **BUDGET ACTIVITY:** 6
PROGRAM ELEMENT TITLE: RDT&E,N Science and Technology Management
PROJECT NUMBER: R0135 **PROJECT TITLE:** OCNR Science and Technology Management

2. (U) FY 1991 PROGRAM: The project will continue to provide support for the OCNR headquarters, the ONR European Office (London), the ONR Asian Office (Tokyo), and field detachments with nationwide university contract administration duties. Beginning in FY-91, this program funds management and formulation of the Navy Advanced Technology Demonstration program (Category 6.3A) and contract negotiation/administration support for the Tri-Service Independent Research and Development and Bid and Proposal programs.

3. (U) FY 1992 PLANS: The project will continue to provide for basic costs of the OCNR headquarters and its field activities in support of the entire Navy Science and Technology program. Specifically, it pays salaries of scientific and engineering personnel who direct the execution of the Navy's basic research (Category 6.1), exploratory development (Category 6.2) and Advanced Technology Demonstration (Category 6.3A) programs at the nation's universities/colleges and Navy laboratories. In addition to its Navy Science and Technology mission, OCNR provides important program management and administrative support to SDIO, DARPA, and CNO. Almost all the funds in this project are fixed costs, such as salaries, building rent, communication, etc. The increase from FY-91 to FY-92 is due to inflation, full-year annualization of pay raises and the full staffing of the new Office of Advanced Technology. Also, Navy's increased investment in FY-92 in the Science and Technology programs directly results in additional costs to manage these programs.

4. (U) FY 1993 PLANS: The project will continue to provide support for the OCNR headquarters, the ONR European Office (London), the ONR Asian Office (Tokyo), and field detachments.

5. (U) PROGRAM TO COMPLETION: The project will continue to provide support for the OCNR headquarters, the ONR European Office (London), the ONR Asian Office (Tokyo), and field detachments. This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: Office of the Chief of Naval Research, Arlington, VA; ONREUR, London, England; ONRASIA, Tokyo, Japan, ONRDET Boston, MA; and ONRDET Bay St. Louis, MS. CONTRACTORS: Not Applicable.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not Applicable.

2. (U) SCHEDULE CHANGES: Not Applicable.

3. (U) COST CHANGES: Decrease of $2.8M in FY 91 is the net result of Congressional reductions and internal reprogrammings.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605861N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: RDT&E,N Science and Technology Management
PROJECT NUMBER: R0135 PROJECT TITLE: OCNR Science and Technology Management

F. (U) PROGRAM DOCUMENTATION: Not Applicable,

G. (U) RELATED ACTIVITIES: Program Element 0605862N (RDT&E Instrumentation Modernization) which funds investment items for the activities covered in this program element.

H. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE: Not Applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605861N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: RDT&E,N Science and Technology Management
PROJECT NUMBER: R1855 PROJECT TITLE: Science/Engineering Training Support

C. (U) DESCRIPTION: Project consists of long term professional education and training for Navy civilian scientists and engineers to maintain and update essential skills and develop new expertise as needed.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS: Provided long-term professional training and education to more than 50 persons.

2. (U) FY 1991 PROGRAM: Plan to provide long-term professional training and education for at least 50 persons.

3. (U) FY 1992 PLANS: Plan to provide long-term professional training and education for more than 50 persons with increased fiscal support provided per person.

4. (U) FY 1993 PLANS: Plan to provide long-term professional training and education for more than 90 persons.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: Not applicable.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS. Not applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605861N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: RDT&E,N Science and Technology Management
PROJECT NUMBER: M0104 **PROJECT TITLE:** Naval Medical Management Support

C. (U) DESCRIPTION: This program funds certain program-wide management and operational costs at the Naval Medical Research and Development Command and specified Naval Medical Laboratories that do not distribute overhead. Funds are used for general administrative expenses including salaries of support personnel, centralized technical services, common support costs under host-tenant agreements, routine maintenance and repair of buildings, and costs of laboratory support provided by other agencies/commands.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:

A. (U) Provided management support for operations at Naval Medical Research and Development Command Headquarters, three in-house laboratories and two detachments.

B. (U) Provided increased support for further development of the Naval Medical Research Institute Detachment in Lima, Peru.

2. (U) FY 1991 PROGRAM: Continue to provide support as described above for those activities identified in paragraph E.

3. (U) FY 1992 PLANS: Continue to provide support for activities identified in paragraph E below. Provide increased support for overseas laboratories required to implement a change in DOD pay raise policies effective in November 1990. The removal of the DOD cap on foreign national (FN) pay raises resulted in pay raises ranging from 35 to 100% to bring Navy FN salaries in line with Embassy employees. Provide additional support for Navy Medical Research Unit-3, Cairo, Egypt, to evaluate infectious diseases in several countries around Egypt.

4. (U) FY 1993 PLANS: Continue to provide management support for those activities identified in paragraph E below.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: Naval Medical Research and Development Command Headquarters, Bethesda, MD; Naval Dental Research Institute, Great Lakes, IL; U.S. Naval Medical Research Unit No. 2, Jakarta, Indonesia; U.S. Naval Medical Research Unit No. 2 Detachment, Manila, RP; U.S. Naval Medical Research Unit No. 3, Cairo, Egypt, Naval Medical Research Institute Detachment, Peru.

F. (U) RELATED ACTIVITIES: Program Element 0605862N, RDT&E Instrumentation Modernization, funds investment items and general purpose equipment for activities in this program element.

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605861N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: RDT&E,N Science and Technology Management
PROJECT NUMBER: X0832 PROJECT TITLE: DNL Management Support

C. (U) DESCRIPTION: This project supports centrally managed interlaboratory projects at the Navy R&D Centers such as the Navy Laboratory CAD-CAM Support Group, the Navy Laboratory Computer Committee, the Engineering Software Support Group, R&D Center Strategic planning, the Navy Laboratory Video Teleconferencing Study Group, and other residual costs resulting from disestablishment or reduction-in-force actions (severance pay/relocation costs).

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS: Provided support to the centrally managed interlaboratory projects and for residual costs.

2. (U) FY 1991 PROGRAM: Continue to provide support as described above.

3. (U) FY 1992 PLANS: Continue to provide support as described above.

4. (U) FY 1993 PLANS: Continue to provide support as described above.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: David Taylor Research Center, Bethesda, MD; Naval Surface Warfare Center, Dahlgren, VA; Naval Weapons Center, China Lake, CA; Naval Underwater Systems Center, Newport, RI; Naval Air Development Center, Warminster, PA; Naval Coastal Systems Center, Panama City, FL; and Naval Ocean Systems Center, San Diego, CA.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1992/1993 RDT&E NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605862N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: RDT&E,N Instrumentation Modernization

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0137	OCNR Instrumentation and Material Support	3,763	5,293	4,929	5,938	Cont.	Cont.
M0105	NAVMED Instrumentation and Material Support	3,060	4,862	4,114	3,354	Cont.	Cont.
S0353	NAVSEA Instrumentation and Material Support	898	1,500	1,263	1,431	Cont.	Cont.
W0566	NAVAIR Instrumentation and Material Support	1,481	2,649	2,232	2,676	Cont.	Cont.
X0799	SPAWAR Instrumentation and Material Support	0	320	268	348	Cont.	Cont.
X0833	DNL Instrumentation and Material Support	1,533	470	363	47	Cont.	Cont.
X1957	Large Cavitation Channel	16,188	5,908	4,954	0	0	73,667
	TOTAL	26,923	21,002	18,123	13,794	Cont.	Cont.

B. (U) DESCRIPTION: This program element funds investment costs at certain Navy research, development, test and evaluation laboratories and facilities. These laboratories and other facilities are involved in diverse activities with the RDT&E,N appropriation, such as, oceanographic and atmospheric research and development, medical R&D including research of new methods of combat casualty care, energy conservation, weapons testing, personnel related research and development, the Navy's space program, and a number of other programs. This program provides for research equipment in support of multiple program requirements at the Naval Oceanographic and Atmospheric Research Laboratory (NOARL).

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY
PROGRAM ELEMENT: 0605862N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: RDT&E,N Instrumentation Modernization
PROJECT NUMBER: R0137 PROJECT TITLE: OCNR Science & Technology Instrumentation Modernization

C. (U) DESCRIPTION: This project provides for acquisition of essential general purpose research equipment and equipment installation at NOARL for oceanographic, acoustic, and atmospheric research and development programs. Ocean, acoustic, polar, and mapping, charting and geodesy equipment is deployed over-the-side, on the bottom, and on the ice in hostile conditions that take a severe toll on even new equipment. This project also provides for ADP equipment related to OCNR Headquarters; for support equipment for OCNR Headquarters and its field offices/detachments; and for general purpose research equipment and minor construction at NPRDC.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS

1. (U) FY 1990 ACCOMPLISHMENTS: NOARL purchased measurement systems capable of making subsurface acoustic environmental measurements and oceanographic mesoscale variability studies. Equipment in support of remote sensing, mapping, charting, and geodesy, polar oceanography and atmospheric sciences was obtained. Equipment for OCNR offices/detachments were supported.

2. (U) FY 1991 PROGRAM: NOARL will purchase specialized acoustic processing equipment and underwater measurement devices to support a number of different technology base experimental programs. Procurements include the expansion of deep sea current observation capabilities which can determine variability of large water masses at depth. A major processing upgrade will be purchased to accommodate new advanced remote sensing capabilities which include multi-altimeters and new ocean application of sea surface heights. New equipment and upgrades will be provided for ocean and atmospheric data assimilation and graphic visualization devices. Equipment for OCNR offices/detachments will be supported.

3. (U) FY 1992 PLANS: NOARL will purchase research equipment to support acoustics, oceanographic and atmospheric programs which will include at sea acoustic measurement equipment, laboratory research equipment, and data processing systems. A major equipment purchase will be a parametric source that will contribute to the resolution of small scale subbottom heterogeneities within marine sediments. Equipment for OCNR offices/detachments will be supported.

4. (U) FY 1993 PLANS: NOARL will continue acquisition of general purpose research equipment to support acoustics, oceanographic, and atmospheric programs. Equipment for OCNR offices/detachments will be supported.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NOARL, Stennis Space Center, MS; NPRDC, San Diego, CA; OCNR, Arlington, VA CONTRACTORS: TBD
F. (U) RELATED ACTIVITIES: Program Element 0605861N (RDT&E,N Science & Technology Mgmt) and Navy R&D S&T programs in oceanography, acoustics, and atmospheric science being performed at NOARL.
G. (U) OTHER APPROPRIATION FUNDS: Not applicable.
H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS. Not applicable.

FY 1992/1993 RDT&E NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605862N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: RDT&E,N Instrumentation Modernization
PROJECT NUMBER: S0353 PROJECT TITLE: NAVSEA Instrumentation and Material Support

C. (U) DESCRIPTION: Funding in this project is used for procurement of needed safety and station equipment; first destination transportation; and the hulk program providing storage, basic configuration and maintenance of RDT&E target ships.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:

a. (U) Procured engineering support equipment.
b. (U) Upgraded production for hardware EOD publication.
c. (U) Procured bow rigging to replenish pool assets.
d. (U) Coordinated assets for pool outyear utilization.
e. (U) Transited Ex-Somers from Pearl Harbor to PMTC.

2. (U) FY 1991 PROGRAM: Procure needed safety and station equipment; first destination transportation; provide technical, engineering and management services for target hulk pool; initiate conversion of Ex-John Paul Jones.

3. (U) FY 1992 PLANS: Procure needed safety and station equipment; first destination transportation; provide technical, maintenance and management services for target hulk pool; identify and obtain target ship to conversion in FY 1993. Complete conversion of Ex-John Paul Jones.

4. (U) FY 1993 PLANS: Procure needed safety and station equipment; first destination transportation; provide technical, engineering and management services for the target hulk pool. Initiate conversion of target ship obtained in FY 92.

5. (U) PROGRAM TO COMPLETION: This is a continuing effort.

E. (U) WORK PERFORMED BY: IN-HOUSE: PACMISTESTCEN, Pt. Mugu, CA.

F. (U) RELATED ACTIVITIES: Over-the-Horizon Air Weapons Systems.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1992/3 RDT&E,N DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605862N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: RDT&E,N INSTRUMENTATION MODERNIZATION
PROJECT NUMBER: W0566 PROJECT TITLE: NAVAIR INSTRUMENTATION AND MATERIAL SUPPORT

C. (U) DESCRIPTION: This is a continuing project that supports energy conservation and environmental compliance and pollution prevention related projects at various Navy Research, Development, Test and Evaluation activities. It also supports instrumentation/equipment and minor construction and alterations at the Naval Weapons Evaluation Facility (NWEF), Albuquerque, NM.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:

a. (U) Provided funding for environmental protection projects to provide compliant storage equipment and facilities for hazardous waste, repair/replacement of Polychlorinated Byphenols (PCB) Transformers, and removal/replacement of leaking underground storage tanks in compliance with U.S. Codes.

b. (U) Provided funding for energy conservation projects.

c. (U) Minor Construction/Alterations for NWEF including updating this 39 year old facility by replacing wiring in some office spaces, and providing required security improvements. Procured/replaced aircraft instrumentation equipment to meet minimum operational and safety requirements for NWEF aircraft.

2. (U) FY 1991 PROGRAM: Provide funding for environmental protection projects for compliant storage and spill containment equipment and facilities for hazardous waste, repair/replacement of Polychlorinated Byphenols (PCB) transformers, and remove/replace leaking underground storage tanks at the RDT&E activities in compliance with U.S. Codes. Provide funding for energy conservation projects. Replacement of office wiring in the continued facility update at NWEF. Provide support for required security improvements at NWEF. Procure/replace aircraft instrumentation equipment to meet minimum operational and safety requirements for NWEF aircraft.

3. (U) FY 1992 PLANS: Continue to provide funding for environmental protection projects at the RDT&E activities for compliant storage equipment and facilities for hazardous waste, repair/replacement of PCB transformers, removal/replacement of leaky underground storage tanks. Complete required security improvements at NWEF. Continue the facility update at NWEF.

4. (U) FY 1993 PLANS: Continue to provide support for RDT&E activities for energy conservation and environmental compliance with pollution prevention, and funds for NWEF aircraft instrumentation/equipment support.

5. (U) PROGRAM TO COMPLETION: This is a long-term continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVWPNEVALFAC, Albuquerque, NM; NAVAIRTESTCEN, Patuxent River, MD; COMPACMISTESTCEN, Pt Mugu, CA; AUTEC, Andros, Bahamas, NAVWPNCEN, China Lake, CA.
CONTRACTORS: Various small contracts for NWEF facility update, instrumentation equipment, and environmental/energy projects and equipment.

F. (U) COMPARISON WITH 1991 PRESIDENT'S BUDGET: Not applicable.

G. (U) RELATED ACTIVITIES: Not applicable.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable, this is a non-acquisition program.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1992/1993 RDT&E NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605862N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: RDT&E,N Instrumentation Modernization
PROJECT NUMBER: X0799 PROJECT TITLE: SPAWAR Material Support

C. (U) DESCRIPTION: This project provides for shipping newly procured research and development materials from the manufacturers to the first destination (First Destination Transportation Cost).

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS: Provides First Destination Transportation funding as described above.

2. (U) FY 1991 PROGRAM: Continue support as described above.

3. (U) FY 1992 PLANS: Continue support as described above.

4. (U) FY 1993 PLANS: Continue support as described above.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: Not applicable.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1992/1993 RDT&E NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605862N **BUDGET ACTIVITY:** 6

PROGRAM ELEMENT TITLE: RDT&E,N Instrumentation Modernization
PROJECT NUMBER: X0833 **PROJECT TITLE:** DNL Instrumentation and Material Support

C. (U) DESCRIPTION: Provides supplemental support for Surveillance Test and Integration Center (STIC), formerly the Acoustic Research Center, San Diego, CA. Supports procurements which do not qualify for the Asset Capitalization Program (ACP) or direct project funding at other SPAWAR R&D Centers.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS: Supported the Surveillance Test and Integration (STIC) and R&D Centers' planning network.

2. (U) FY 1991 PROGRAM: Continue to provide support as described above but at a reduced level.

3. (U) FY 1992 PLANS: Reduce support to STIC but continue to provide support for interlaboratory projects. This is the last year for STIC support.

4. (U) FY 1993 PLANS: Continue to provide support for interlaboratory projects.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: In-House: Naval Ocean Systems Center, San Diego, CA; David Taylor Research Center, Bethesda, MD.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1992/1993 RDT&E NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605862N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: RDT&E,N Instrumentation Modernization
PROJECT NUMBER: X1957 PROJECT TITLE: Large Cavitation Channel (LCC)

C. (U) DESCRIPTION: This project provides a pressure-controlled water channel (similar to a windtunnel) for the David Taylor Research Center. The channel will be used for acoustic and hydrodynamic testing of large scale models of surface ships, submarines, and torpedoes. At present, propellers and other propulsors are tested in cavitation tunnels using small model sizes in the absence of the hull and appendages. In the past, it has been possible to account for the influence of the hull on the model propeller tests, by using an extensive background of practical experience. Now, however, high performance hulls, appendages, and propulsors are being designed to meet special requirements, such as reduced noise, reduced vibration, and high efficiency, to which existing data and experience do not apply. Present test techniques have failed to predict or resolve problems of cavitation erosion and vibration and noise problems. These particular failures have increased costs and delayed for a year or more bringing some ships into full service. The cavitation channel will provide the capability to measure the acoustic and hydrodynamic performance of hull, propulsor, and appendages as an integrated package. Thus, model tests in the channel will reliably predict full scale performance, which will enable quieter and more efficient ship designs to be developed while avoiding the above mentioned problems.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:
1. (U) FY 1990 ACCOMPLISHMENTS:
a. Completed installation of all channel control systems.
b. Completed installation of channel structure.
2. (U) FY 1991 PROGRAM:
a. Complete channel contract.
b. Conduct calibration and "shakedown" tests.
c. Initiate propeller tests.
d. Operate the LCC with property leasing agreements.
3. (U) FY 1992 PLANS: Continue operation of the LCC and continue leasehold payments.
4. (U) FY 1993 PLANS: Not applicable.
5. (U) PROGRAM TO COMPLETION: Continue operation of the LCC and make final purchase in the MILCON program.

E. (U) WORK PERFORMED BY: In-House: David Taylor Research Center, Bethesda, MD Contractor: CBI NA-CON, INC, Memphis, TN.
F. (U) RELATED ACTIVITIES: Not applicable
G. (U) OTHER APPROPRIATION FUNDS: MILCON
H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0605862N **Budget Activity:** 6
Program Element Title: RDT&E Instrumentation Modernization
Project Number: M0105 **Project Title:** NAVMED INST & MAT SPT

C. (U) DESCRIPTION: This continuing program funds the procurement of new and replacement general purpose analytical and research support equipment, minor construction, alterations, equipment installation, and first destination transportation cost of newly purchased equipment for the Naval Medical Research and Development Command Headquarters, eight Medical Research laboratories and three detachments. Provides funds to meet Congressionally mandated standards for Laboratory Animal Facilities.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments

a. (U) Provided laboratory spaces and improvements to aging laboratory facilities. Made progress toward USD(R&E) directed goal in meeting American Association for Accreditation of Laboratory Animal Care standards.

b. (U) Provided new technology analytical instrumentation and replacement of obsolete research equipment.

2. (U) FY 1991 Program: Continue to provide support as described above for activities identified in paragraph E. below.

3. (U) FY 1992 Plans: Continue to provide support as described above for activities identified in paragraph E. below.

4. (U) FY 1993 Plans: Continue to provide support as described above for activities identified in paragraph E. below.

5. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVMEDRSCHDEVCOM BETHESDA MD; NAVAEROMEDRSCHLAB PENSACOLA FL; NAVBIODYNLAB NEW ORLEANS LA; NAVDENRSCHINSTITUTE GREAT LAKES IL; NAVHLTHRSCHCEN SAN DIEGO CA; NAVMEDRSCHINSTITUTE BETHESDA MD; NAVSUBMEDRSCHLAB NEW LONDON CT; NAVMEDRSCHU TWO JAKARTA ID; NAVMEDRSCHU THREE CAIRO EGYPT; NAVMEDRSCHU TWO DET MANILA RP; NAVMEDRSCHINSTITUTE DET LIMA PE; NAVMEDRSCHINSTITUTE TOX DET WPAFB OH. CONTRACTORS: No major contractors.

F. (U) RELATED ACTIVITIES: Program Element 0605861N, RDT&E Laboratory and Management Support, funds Management Support for operations at Naval Medical Research and Development Command Headquarters, three in-house laboratories and two detachments.

G. (U) OTHER APPROPRIATION FUNDS: N/A.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: N/A.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605863N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: RDT&E SHIP AND AIRCRAFT SUPPORT

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0354	RDT&E SHIPS SUPPORT	14,313	13,838	14,537	23,514	CONT.	CONT.
W0568	RDT&E AIRCRAFT FLIGHT HOURS	12,090	9,613	10,955	13,591	CONT.	CONT.
W0569	RDT&E AIRCRAFT SUPPORT	51,045	48,217	50,906	58,041	CONT.	CONT.
X2099	CRITICAL SEA TEST II, SHIP SPT	0	0	9,943	15,057	45,256	70,256
	TOTAL	77,448	71,668	86,341	110,203	CONT.	CONT.

B. (U) DESCRIPTION: This continuing program provides support for ships and platforms required to accommodate Research, Development, Test and Evaluation (RDT&E) of new systems. The RDT&E ships and aircraft inventory is required to adequately test new and improved weapon systems, stay current with the threat, and increase warfighting capability of the fleet. The program supports aircraft at selected field activities; provides Depot level rework of aircraft, engines, components for the Navy inventory of RDT&E aircraft; and provides support ships and aircraft bailed to contractors for Navy RDT&E projects. The program supports the cost for leasing and operating two ships in support of Critical Sea Test II. Costs covered under this element include aircrew training/proficiency, fuel, supplies, equipment, modification, repair, Aviation Depot Level Repairables, Special Flight Test Instrumentation Pool equipment, overhaul of ships and aircraft, as well as Organizational, Intermediate, and Depot maintenance of ships and aircraft in the Navy RDT&E inventory.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605863N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: RDT&E Ship and Aircraft Support
PROJECT NUMBER: S0354 PROJECT TITLE: RDT&E Ships Support

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0354	RDT&E Ships Support	14,313	13,838	14,537	23,514	CONT.	CONT.

B. (U) DESCRIPTION: This project provides for operation and maintenance of platforms used as Sea Based Test Sites in support of the Navy RDT&E program. These are USS DOLPHIN (AGSS 555), the Floating Instrumentation Platform (FLIP) and the Oceanographic Research Buoy (ORB). Beginning in FY 90, EX-USS DECATUR (DDG-31) is being supported by this line as the Self-Defense Test Ship (SDTS). Testing aboard these platforms reduces the number of fleet units required to support RDT&E efforts. A major cost of this project is regularly scheduled ship overhauls. The USS DOLPHIN will be overhauled during FY 92-94. The remainder of the funds are used for purchase of supplies and equipment, fuel and petroleum products, repairs and supporting modifications. Most costs are fixed and are associated with simply having these platforms in the inventory. A lesser portion varies with the tempo and type of ship operations and provides for system improvements and replacement planning. The nature of the operation is determined by the overall Navy R&D testing program. The current and projected Anti-Ship Cruise Missile (ASCM) threat requires self-defense weapon systems capable of adequately countering the ASCM's into the year 2000. The National Defense Authorization Act for FY 87, section 910, "Testing of Certain Weapons System and Munitions" requires live-fire lethality testing of major weapons systems. Operational and safety constraints limit realistic live-fire lethality testing with manned U.S. Navy ships and thus drive the requirement for having an afloat, unmanned, remotely controlled Self-Defense Test Site (SDTS) (USS DECATUR will be converted to the SDTS). The SDTS plans call for testing Close-In-Weapons System (CIWS), NATO Sea Sparrow, SLQ-32(V3), AN/SAR-8 Infrared Search and Target Designation system, and future short range AAW systems against realistic threat presentations in an at-sea environment.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

a. (U) USS DOLPHIN supports near ocean bottom operations and RDT&E concerning sonar propagation, laser bottom imaging, Unmanned Underwater Vehicle (UUV) testing and other acoustic research in deep ocean.

b. (U) FLIP/ORB conducted underwater acoustic and noise phenomena research to support ASW needs. Concept studies for a FLIP replacement were completed.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605863N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: RDT&E Ship and Aircraft Support
PROJECT NUMBER: S0354 PROJECT TITLE: RDT&E Ships Support

c. (U) Conversion of the EX-USS DECATUR (DDG 31) to the Navy Self Defense Test Ship began with Hull, Mechancial and Electrical (HM&E) and combat system installation designs, remote control systems design, and initiation of stern drive procurement (delivery of stern drives expected by 3rd quarter FY91). Designs for combat systems installation are complete for: 1. TAS Mk-23 radar, 2. AN/SLQ-32 (V3) Electronic Countermeasure Set, 3. Mk-31 Rolling Airframe Missile (RAM) Guided Missile Weapon System (GMWS), 4. Mk-15 Close In Weapon System (CIWS), 5. NATO Sea Sparrow Missile System (NSSMS) and 6. Super Rapid Blooming Offboard Countermeasures (SRBOC). Designs and specifications for HM&E modifications and installations are 99% complete. These include diesel powered stern drives and bowthruster, 60 and 400hz power generation equipment. Design and procurement of ship and combat systems remote control systems are in progress. Documentation of SDTS operation and safety is in progress. Documentation of SDTS operation and safety is in progress with completion due 4th quarter FY92.

2. (U) FY 1991 Program:

a. (U) USS DOLPHIN will continue to support near ocean bottom operations and other RDT&E programs testing sensors, UUVs, communication systems, structures, weapons and machinery systems. DOLPHIN will serve as test platform for DARPA initiative on off-board sensors and submerged submarine to air laser communications.

b. (U) FLIP/ORB will conduct underwater acoustic and noise phenomena research to support ASW needs.

c. (U) Solicitation for the DECATUR conversion will be released 2nd quarter with contract award expected early 3rd quarter. The conversion will begin immediately upon contract award and be complete by 1st quarter FY 92 including procurement, installation, and refurbishment of ship systems, damage control, communications, navigation, and modifications required to support HM&E designs for combat system support. (Installation of the weapon systems is planned as a series of options pending funding by the respective program offices.) Upon completion of the conversion, SDTS will be ready for outfitting and operations. Propulsion and steering will be remotely controllable; electrical power, heating, ventilation, and air conditioning, (HVAC), and cooling water will be ready to support all combat systems as well as "hotel" loads.

3. (U) FY 1992 Plans:

a. (U) USS DOLPHIN will support near ocean bottom operations and other RDT&E programs testing advanced submarine sensors, communication systems, UUVs, structures, weapons, and machinery systems. DOLPHIN will have a required Regular Overhaul (ROH) during late FY 1992 through early FY 1994.

b. (U) FLIP/ORB will conduct underwater acoustic and noise phenomena research to support ASW needs.

c. (U) SDTS (EX-USS DECATUR) will conduct sea trials to test ship systems in the Puget Sound area following shipyard availability. Following acceptance by the Navy, it will be towed to its home port of Port Hueneme, CA. Completion of combat system and remote controls installation will precede range

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605863N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: RDT&E Ship and Aircraft Support
PROJECT NUMBER: S0354 PROJECT TITLE: RDT&E Ships Support

trials at PACMISTESTCEN (PMTC). Final approval of all applicable operational, safety, and maintenance documentation will be given by PMTC and the SDTS will be certified for live-fire operations.

4. (U) FY 1993 Plans:

a. (U) USS DOLPHIN - Regular overhaul continues at Mare Island Naval Shipyard. (Tesing and certification scheduled to complete in FY 1994.)

b. (U) FLIP/ORB will conduct underwater acoustic and noise phenomena research to support ASW needs.

c. (U) SDTS will conduct live-fire operations at PMTC as required to support RAM, CIWS, NSSMS, and other self defense systems as may be required.

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSHIPWPNSYSENGSTA Port Hueneme, CA; PACMISTESTCEN Point Mugu, CA; SUPSHIP Seattle, WA; NAVSHIPYD Mare Island, Vallejo, CA; NAVOCEANSYSCEN San Diego, CA; DTRC Carderock and Annapolis, MD; NRL Washington DC. CONTRACTORS: Applied Research Laboratories, Austin, TX; Charles Stark Draper Laboratories, Cambridge, MA; Woods Hole Ocean Institute, Woods Hole, MA; University of California, San Diego, CA; Johns Hopkins University Applied Physics Laboratory, Laurel. MD.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
1. (U) Technology Changes: No change
2. (U) Schedule Changes: No change
3. (U) Cost Changes: Not applicable

F. (U) PROGRAM DOCUMENTATION: Not applicable

G. (U) RELATED ACTIVITIES: DECATUR: Program Element 0604369N, (Rolling Airframe Missile).

H. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

J. (U) MILESTONE SCHEDULE: Not applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605863N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: RDT&E Ships and Aircraft Support
PROJECT NUMBER: W0568 PROJECT TITLE: RDT&E Aircraft Flight Hours

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0568	RDT&E ACFT FLT HOURS	12,090	9,613	10,955	13,591	CONT.	CONT.

B. (U) DESCRIPTION: This non-acquisition project provides aircraft flight hours/operating support for RDT&E programs at six NAVAIR/SPAWAR/OCNR activities. Support includes aircrew training, pilot Naval Air Training and Operating Procedures Standardization (NATOPS) proficiency/currency requirements, annual simulator training, transition to new aircraft types, Organizational level and Intermediate level maintenance and associated consumables, petroleum, fuel and lubricants.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: 9,890 flight hours for pilot training/qualification and for testing support of RDT&E projects were flown.

a. (U) Provided the maintenance and support for aircraft required by RDT&E Projects.

2. (U) FY 1991 Program: Plan to fly 9000 flight hours in FY 1991.

a. (U) Continue providing the maintenance and support, for aircraft required by RDT&E Projects. Update RDT&E aircaft inventory as feasible.

3. (U) FY 1992 Plans: Plan to fly 8,500 flight hours in FY 1992.

a. (U) Continue providing the maintenance and support for aircraft required by RDT&E Projects. Updated aircraft replacement to continue.

4. (U) FY 1993 Program: Plan to fly 10,000 flight hours in FY 1993. The increase in flight hours is due to changes in aircraft inventory. Newer, more sophisticated aircraft which require more flight hour training/qualifications are replacing older, less complicated aircraft (e.g., F/A-18 replacing A-7).

a. (U) Continue providing the maintenance and support for aircraft required by RDT&E Projects. Updated aircraft replacement to continue.

5. (U) Program to Completion: This is a continuing program.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605863N **BUDGET ACTIVITY:** 6
PROGRAM ELEMENT TITLE: RDT&E Ships and Aircraft Support
PROJECT NUMBER: W0568 **PROJECT TITLE:** RDT&E Aircraft Flight Hours

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRDEVCEN Warminster, PA; NAVCOASTSYSCEN Panama City, FL; PACMISTESTCEN (non-range), Point Mugu, CA; NRL Washington, DC; NAVAIRENGCEN Lakehurst, NJ; NAVWPNEVALFAC Albuquerque, NM; and NAVTRASYSCEN Orlando, FL.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable

2. (U) Schedule Changes: Not applicable.

3. (U) Cost Changes: The reduction of $-1,448K in FY91 will result in fewer hours flown by some RDT&E activities.

F. (U) PROGRAM DOCUMENTATION: Not applicable

G. (U) RELATED ACTIVITIES: Not applicable

H. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable

J. (U) MILESTONE SCHEDULE: Not applicable

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605863N **BUDGET ACTIVITY:** 6
PROGRAM ELEMENT TITLE: RDT&E Ships and Aircraft Support
PROJECT NUMBER: W0569 **PROJECT TITLE:** RDT&E Aircraft Support

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0569	RDT&E ACFT SPT	51,045	48,217	50,906	58,041	CONT.	CONT.

B. (U) DESCRIPTION: This continuing project provides for the Depot level maintenance and rework of over 200 Navy RDT&E fixed and rotary wing aircraft required to accommodate test and evaluation of weapons systems in development. It also supports engines, aircraft material condition and field inspections, and emergency repair. In addition, it provides for Individual Material Readiness List (IMRL) tools and support equipment needed to perform aircraft maintenance; modification of in-service aircraft and other systems for application to and compatibility with RDT&E requirements, Special Flight Test Instrumentation Pool (SFTIP) equipment, shared/reused by programs to reduce/eliminate procurement lead times and save money when provided as GFE; Aviation Depot Level Repairables (AVDLRs), which are spare/replacement installed aircraft parts and components; and support of aircraft bailed to contractor facilities. Beginning in FY 1992, the project will fund the RDT&E modification of three Naval Research Lab (NRL) replacement P-3 aircraft.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: The following programs were supported: Standard Depot Level Maintenance (SDLM), IMRL, engine support, SFTIP and AVLDRs for over 200 aircraft in the RDT&E inventory, and contractor bailed aircraft (40 aircraft) support including consumables. Twenty aircraft were reworked.

2. (U) FY 1991 Program: The following programs will be supported: Depot level maintenance/SDLM, IMRL, engine support, SFTIP and AVDLRs for over 200 aircraft in the RDT&E inventory, and contractor bailed aircraft (40 aircraft) support including consumables. Due to the high pass rate of material condition/Aircraft Service Period Adjustment (ASPA) inspections in the prior year, more aircaft of the RDT&E inventory will reach ASPA inspection numbers 3 and 4 in FY91. This is a prime indication that more aircraft will experience failures, requiring SDLM induction. As complicated RDT&E aircraft, these aircraft will cost more than usual to rework. Eight aircraft are projected to be reworked with available resources. The Naval Air Logistics Command Information System (NALCOMIS) will be implemented at the Naval Air Test Center (NATC).

3. (U) FY 1992 Plans: The program will support the following: Depot level maintenance/SDLM, IMRL, engine support, SFTIP and AVLDRs for over 200 aircraft in the RDT&E inventory, and contractor bailed aircraft (40 aircraft) support including consumables. The cost of reworks and maintenance support are rising, and are higher

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605863N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: RDT&E Ships and Aircraft Support
PROJECT NUMBER: W0569 PROJECT TITLE: RDT&E Aircraft Support

for the newer individual aircraft types that are entering the inventory. Twenty aircraft are projected to be reworked, and the first RDT&E conversion of replacement NRL P-3 aircraft will begin. NALCOMIS implementation continues, and the Maintenance Training Improvement Program (MTIP) will be initially implemented for the first RDT&E activity.

4. (U) FY 1993 Plans: The following programs are included: Depot level maintenance/SDLM, IMRL, engine support, SFTIP and AVLDRs for over 200 aircraft in the RDT&E inventory, and contractor bailed aircraft (40 aircraft) support including consumables. An estimated twenty aircraft will be reworked. RDT&E conversion of NRL P-3 aircraft will continue as feasible.

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRTESTCEN Patuxent River, MD; NAVAIRDEVCEN Warminister, PA; NAVCOASTSYSCEN Panama City, FL; PACMISTESTCEN Point Mugu, CA; NRL Washington, DC; NAVAIRENGCEN Lakehurst, NJ; NAVWPNCEN China Lake, CA; NAVWPNEVALFAC Albuquerque, NM; and NUSC DET AUTEC West Palm Beach, FL; NAVAVNDEPOT Norfolk, VA; NAVAVNDEPOT North Island, CA; NAVAVNDEPOT Pensacola, FL; NAVAVNDEPOT Cherry Point, NC; NAVAVNDEPOT Jacksonville, FL; NAVAVNDEPOT Alameda, CA; DPRO Stratford, CT; DPRO Bethpage, NY; DPRO Ft. Worth, TX; NAVAVNMAINTOFF Patuxent River, MD.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable

2. (U) Schedule Changes: Not applicable.

3. (U) Cost Changes: The reduction of $-11,558K will result in reduced aircraft maintenance and support.

F. (U) PROGRAM DOCUMENTATION: Not applicable
G. (U) RELATED ACTIVITIES: Not applicable
H. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.
I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable
J. (U) MILESTONE SCHEDULE: Not applicable

FY 1992/3, NAVY RDT&E NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605863N BUDGET ACTIVITY 6
PROGRAM ELEMENT TITLE: RDT&E SHIP/AIRCRAFT SUPPORT
PROJECT NUMBER: X2099 PROJECT TITLE: CRITICAL SEA TEST II, SHIP SUPPORT

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ESTIMATE	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X2099	CST II, SHIP SUPPORT	0	0	9,943	15,057	45,256	70,256

B. (U) DESCRIPTION:

(U) Two sea-going platforms are dedicated to the Critical Sea Test (CST) II Program, with support to LFA/SURTASS and ADI system development and one special research project. The ships are the R/V CORY CHOUEST and R/V AMY CHOUEST, U.S. reflagged and converted oil rig supply vessels capable of worldwide operations, under long term lease. They were previously funded under Program Element 0603792N, Advanced Technology Transition. CORY CHOUEST has been outfitted with uniquely designed systems, consisting of source arrays, receive arrays, and processors. Measurements from this platform can be conducted with sufficient resolution to allow interpolation of the results for prediction of developmental system performance. AMY CHOUEST is equipped with an echo repeater system, satellite communications, and environmental support systems.

(U) The two ships have a crew of 15; CORY CHOUEST can carry 59 passengers/scientists, and AMY CHOUEST has accommodations for 68. They carry provisions for 90 days and 500,000 gal each diesel fuel and fresh water (no onboard distilling capability). Powered by two German MAK, 2400 HP, 6 cylinder diesel engines, they have a maximum sustained speed of 11 knots with a fuel consumption rating of 4000 gal/day. They are capable of highly controlled maneuvering with control stations on the bridge and after deck, two variable pitch propellers, and fore and aft tunnel thrusters. Dimensions are 265 ft length, 59 ft. beam, and 14.5 draft with 1500 gross tonnage.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS: Not applicable

2. (U) FY 1991 PROGRAM: Not applicable

3. (U) FY 1992 Plans:

a. (U) Lease and provide basic operating costs including manning for at-sea support of onboard GFE equipment of the CORY and AMY CHOUEST R&D ships to support two CST at-sea tests.

b. (U) Lease and provide basic operating costs including manning for at-sea support of onboard GFE equipment of the CORY and AMY CHOUEST R&D ships to support two SURTASS program tests.

c. (U) Lease and provide basic opening costs include manning for at-sea support of onboard GFE equipment of the CORY and AMY CHOUEST R&D ships to

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605863N BUDGET ACTIVITY 6
PROGRAM ELEMENT TITLE: RDT&E SHIP/AIRCRAFT SUPPORT
PROJECT NUMBER: X2099 PROJECT TITLE: CRITICAL SEA TEST II, SHIP SUPPORT

support one ADI program test.

4. (U) FY 1993 Plans:
   a. (U) Lease and provide basic operating costs of the CORY and AMY CHOUEST R&D ships to support two CST at-sea tests.
   b. (U) Support two ONR special research project tests.
   c. (U) Support two SURTASS program tests.
   d. (U) Support one ADI program test.

5. (U) PROGRAM TO COMPLETION:
   a. (U) Support two CST at-sea tests per year in FY 1994 and FY 1995.
   b. (U) Support one CST at-sea test in FY 1996.
   c. (U) Support SURTASS at-sea tests in FY 1994 and FY 1995.
   d. (U) Support ADI at-sea tests in FY 1994 and FY 1995.
   e. (U) Demobilize and release assets by end of FY 1996.

D. (U) WORK PERFORMED BY: In-House: COMSPAWARSYSCOM, Washington, D.C.; MSC, Washington, D.C.; NAVOCEANSYSCEN, San Diego, CA; NAVCIVENGLAB, Pt Hueneme, CA. Contractors: The Johns Hopkins University/Applied Physics Laboratory, Laurel, MD; Edison Chouest Offshore, Gallinao, LA; GE Government Services, Virginia Beach, VA.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
   1. (U) Technology Changes: Not applicable
   2. (U) Schedule Changes: Not applicable
   3. (U) Cost Changes: Not applicable

F. (U) PROGRAM DOCUMENTATION: Not applicable

G. (U) RELATED ACTIVITIES: PE 0603747N (Advanced ASW Technology); PE 0603785N (ASW Environmental Acoustical Support (AEAS)); PE 0204311N (Integrated Undersea Surveillance System (IUSS) Development); PE 0603741D (Air Defense Initiative); PE 0603737D (Balanced Technology Initiative); PE 0601153N (6.1 Basic Research Navy).

H. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable

J. (U) MILESTONE SCHEDULE: Not applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605864N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Test and Evaluation Support

A. (U) Resources: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
WO541	AUTEC	49,272	49,891	51,276	55,014	CONT	CONT
WO653	PMTC	99,350	97,892	100,310	94,274	CONT	CONT
WO654	NATC	81,260	77,225	79,169	72,007	CONT	CONT
WO655	NAPC	23,439	24,892	25,117	24,223	CONT	CONT
WO657	NWC	68,038	67,422	71,219	70,053	CONT	CONT
W2125	T&E Modernization	-	-	15,000	20,000	CONT	CONT
	TOTAL	321,359	317,322	342,091	335,571	CONT	CONT

B. (U) DESCRIPTION: This program provides institutional Maintenance and Operations (M&O) and Improvement and Modernization (I&M) support for the five test and evaluation activities that make up the Navy portion of the Department of Defense Major Range and Test Facility Base (MRTFB). These five activities are: the Atlantic Undersea Test and Evaluation Center (AUTEC), Andros Island, Bahamas; the Pacific Missile Test Center (PMTC), Point. Mugu, CA; the Naval Air Test Center (NATC), Patuxent River, MD; the Naval Air Propulsion Center (NAPC), Trenton, NJ; and the Naval Weapons Center (NWC), China Lake, CA. These test and evaluation activities are chartered to have the capability and capacity to perform the full spectrum of developmental and operational test and evaluation required by Navy research, development and technologically advanced weapon system acquisition and improvement programs. Adequate state-of-the-art and realistic test and evaluation is paramount in providing the operational forces effective weapon systems to counter a dynamic threat environment. Above the level-of-effort institutional M&O, this program develops and acquires the sophisticated instrumentation systems required to test modern advance weapon systems and improvements to existing systems. This program (within project WO653) also provides the David W. Taylor Ship Research and Development Center, Bethesda, MD, operation and maintenance support for the Santa Cruz Radar Cross Section (RCS) range, which is designed to provide full-scale cross section RCS measurements of Navy ships in the ocean environment. This program (within project W2125) also continues on-going test and evaluation (T&E) modernization for the MRTFB facilities to correct major deficiencies in T&E capabilities and increase T&E support effectiveness. Project (W2125) funding has been transferred from the Office of Secretary of Defense Central Test and Evaluation Improvement Program, Program Element 0604940D as result of Congressional action on the FY 1991 budget.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605864N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Test and Evaluation Support
PROJECT NUMBER: W0541 PROJECT TITLE: Atlantic Undersea Test and Evaluation Center

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROG
W0541	AUTEC	49,272	49,891	51,276	55,014	CONT	CONT

B. (U) DESCRIPTION: Atlantic Undersea Test and Evaluation Center (AUTEC) provides a deep water test and evaluation facility for making selected underwater acoustic measurements, testing and calibrating sonars, and providing accurate underwater, surface and air tracking data on test participants. AUTEC includes the Weapons Range, Fleet Operational Readiness Accuracy Check Site, Weapons Acoustic Measurement Capabilities and an Ocean Haul Down Facility for large buoyant bodies. The Weapons Range provides three dimensional (undersea, surface, air) precision tracking capability in support of Anti-Submarine Warfare Development Test and Evaluation and Operational Test and Evaluation. Major training operations which include fleet readiness exercises and tactical development trials are also conducted on the weapons range. The fleet Operational Readiness Accuracy Check Site provides the capability to accurately calibrate and align electronic, optical, acoustic, and navigational systems installed on submarines and surface ships. Naval Underwater Systems Center detachment at West Palm Beach, Florida, provides technical expertise in tracking systems, liaison and test planning with range users, test scheduling, and logistic support.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

a. (U) Maintained and repaired the physical plant; purchased critical marine spares; performed marine craft maintenance; continued contract administration support and rental payments to Bahamian government.

b. (U) Continued Operations Security (OPSEC) improvements.

c. (U) Initiated the design configuration for a Deep Water Torpedo Noise Measurement System.

d. (U) Continued acquisition of a Distributed Data Processing/ Communication System.

e. (U) Completed the Sonobuoy Tracking System project.

f. (U) Initiated planning for the Torpedo Launch Tube.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605864N **BUDGET ACTIVITY:** 6
PROGRAM ELEMENT TITLE: Test and Evaluation Support
PROJECT NUMBER: W0541 **PROJECT TITLE:** Atlantic Undersea Test and Evaluation Center

2. (U) FY 1991 Program:

a. (U) Continue to maintain and repair the physical plant; purchase critical marine spares; perform marine craft maintenance; continue contract administration support and rental payments to Bahamian government.

b. (U) Continue upgrades for OPSEC.

c. (U) Continue design/development of the Deep Water Torpedo Noise Measurement System.

d. (U) Continue procurement/installation of a Distributed Data Processing/Communication System.

e. (U) Prepare specification and plan for installation of a Torpedo Launch Tube on an AUTEC vessel to support new development weapon vehicles.

f. (U) Initiate lease payment of facilities at West Palm Beach.

3. (U) FY 1992 Plans:

a. (U) Continue to maintain and repair the physical plant; maintain adequate marine spares and marine craft readiness; provide OPSEC maintenance and operations; continue contract administration support and rental payments to Bahamian government.

b. (U) Continue upgrades for OPSEC.

c. (U) Complete the Deep Water Torpedo Noise Measurement System.

d. (U) Continue the Distributed Data Processing/ Communication System.

e. (U) Continue tests on the installed Torpedo Launch Tube.

f. (U) Continue lease payment of facilities at West Palm Beach.

g. (U) Initiate the Phase Code Processing Project.

4. (U) FY 1993 Plans:

a. (U) Continue to maintain and repair the physical plant; maintain adequate spares; provide OPSEC maintenance and operations; continue contract administration support and rental payments to the Bahamian government.

b. (U) Complete upgrades for OPSEC.

c. (U) Continue work on the Distributed Data processing/Communication System.

d. (U) Complete installation of the Torpedo Launch Tube.

e. (U) Continue the Phase Coded Processing Project.

f. (U) Continue lease payment of facilities at West Palm Beach.

5. (U) Program to Completion: This is a continuing program.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605864N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Test and Evaluation Support
PROJECT NUMBER: W0541 PROJECT TITLE: Atlantic Undersea Test and Evaluation Center

D. (U) WORK PERFORMED BY: IN-HOUSE: Technical services are performed by the NUSC, Newport, RI; and COMNAVOCEANCOM, Bay St. Louis, MO, CONTRACTORS: The Maintenance and Operation of the AUTEC is being performed by General Electric Government Services, Cherry Hill, NJ.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
1. (U) Technology Changes: Not Applicable.
2. (U) Schedule Changes: Not Applicable.
3. (U) Cost Changes: The FY-91 decrease of $-5,616K will delay implementation of improvements and repairs to range instrumentation and facilities.

F. (U) PROGRAM DOCUMENTATION: Not Applicable.

G. (U) RELATED ACTIVITIES: Not Applicable

H. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE: Not Applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605864N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Test and Evaluation Support
PROJECT NUMBER: W0653 PROJECT TITLE: Pacific Missile Test Center

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0653	PMTC	99,350	97,892	100,310	94,274	CONT	CONT

B. (U) DESCRIPTION: Pacific Missile Test Center (PMTC) provides range support to the Department of Defense and other government agencies for launching, tracking and collecting data in guided and ballistic missiles, satellite and space vehicle research, various development, test and evaluation, and training programs. Range support includes: metric tracking of test objects; command, control, and destruct for range safety purposes; communications; frequency interference control and analysis; and data reduction. This project provides the David W. Taylor Ship Research and Development Center (DTRC) operation and maintenance support for the Santa Cruz Radar Cross Section (RCS) Facility.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

a. (U) Maintained and repaired physical plant; met demands for more realistic over-the-horizon testing; provided technical training for personnel to maintain their technical skills; performed operations security administration and other support functions.

b. (U) Continued Operations Security (OPSEC) improvements; procured OPSEC digital voice conferencing switch.

c. (U) Continued range operations control room modernization. Demonstrated prototype capability of the General Range Interactive Display System.

d. (U) Monitored in-plant manufacture and assembly of real-time Telemetry Processing System.

e. (U) Initiated support for DTRC open ocean RCS Facility.

f. (U) Continued the design definition for the replacement of the real-time and post-flight computers in the range data processing center. Began installation of computer no-break power system.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605864N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Test and Evaluation Support
PROJECT NUMBER: W0653 PROJECT TITLE: Pacific Missile Test Center

g. (U) Procured/install three UYK-43 computers and NORDEN UYQ-21 console emulators for the Naval Tactical Data System/Advance Combat Direction System (ACDS).

h. (U) Initiated procurement document preparation for underwater fiber optics link with San Nicholas Island (SNI).

i. (U) Continued Radio Frequency (RF) communication improvements.

j. (U) Began evaluation of initial telemetry radome installation at Point Mugu. Began antenna feed replacement improvements.

2. (U) FY 1991 Program:

a. (U) Continue to maintain and repair physical plant; expand over-the-horizon test areas; continue OPSEC administration; and sustain range operations, development and support.

b. (U) Continue OPSEC voice and data link improvements.

c. (U) Continue range control room modernization.

d. (U) Continue support for the DTRC open ocean RCS facility.

e. (U) Complete installation and acceptance of the real-time telemetry processing system.

f. (U) Procure support systems for the real-time computers in the range data processing center. Procure an interim mass memory system. Complete installation and acceptance of the No-Break Power System.

g. (U) Continue work on the underwater fiber optics link for SNI.

h. (U) Continue RF communications improvements.

i. (U) Continue evaluation of telemetry radome installation.

j. (U) Continue antenna feed replacement improvements.

3. (U) FY 1992 Plans:

a. (U) Continue to maintain and repair the physical plant; expand over-the-horizon test areas; continue OPSEC administration; and sustain range operations, development and support.

b. (U) Continue OPSEC voice data link improvements.

c. (U) Continue range control room modernization.

d. (U) Continue support for the DTRC open ocean RCS Facility.

e. (U) Continue work on the underwater fiber optics link for SNI.

f. (U) Continue RF communications improvements.

g. (U) Replace telemetry antenna feeds.

h. (U) Procure ACDS software development system.

4. (U) FY 1993 Plans:

a. (U) Continue to maintain and repair the physical plant; expand over-the-horizon test capabilities and sustain range operations, development and support.

b. (U) Continue OPSEC voice data link improvements.

c. (U) Continue range control room modernization.

d. (U) Continue support for the DTRC open ocean RCS Facility.

e. (U) Continue RF communications improvements.

f. (U) Replace the Sensor Position and Read Back System for metric radars.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605864N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Test and Evaluation Support
PROJECT NUMBER: W0653 PROJECT TITLE: Pacific Missile Test Center

g. (U) Initiate procurement of a computer/radar interface for the Range Control System.

h. (U) Complete procurement of the San Nicholas Island-Point Mugu fiber optics underwater cable.

i. (U) Replace the Extended Area Test System master operations center computers.

5. (U) Program to Completion: This a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: PACMISTESTCEN, Point Mugu, California, and NAVAIRSTA, Point Mugu, California (including outlying field, San Nicholas Island). CONTRACTORS: Dynalectron Corporation, Santa Barbara, California; Computer Sciences Corporation, Los Angeles, California; Litton Industries, Los Angeles, California; UNISYS, New York, New York; and SRS Technology, Camarillo, California.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not Applicable.
2. (U) SCHEDULE CHANGES: Not applicable.
3. (U) Cost Changes: The FY-91 decrease of $-7,720 will delay range improvements.

F. (U) PROGRAM DOCUMENTATION: Not Applicable.

G. (U) RELATED ACTIVITIES: Pacific Missile Test Center provides inter-range support to the Western Space and Missile Center, White Sands Missile Range, Kwajelein Missile Range, and the Satellite Control Facility on strategic missile and space programs. Program Element 0604940D, Test Instrument Development: initiate development, procurement, and implementation of fixed and mobile threat simulators. Program Element 0602122N, Aircraft Technology: conduct studies on new telemetry bands, spectral incidence sensors, RF signature measurements and model.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) MILCON	-	2,070	-	-	CONT	CONT

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE: Not Applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605864N **BUDGET ACTIVITY:** 6
PROGRAM ELEMENT TITLE: Test and Evaluation Support
PROJECT NUMBER: WO654 **PROJECT TITLE:** Naval Air Test Center

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
WO654	NATC	81,260	77,225	79,169	72,007	CONT	CONT

B. (U) DESCRIPTION: The Naval Air Test Center (NATC) performs development, test and evaluation of the total aircraft weapon system, including mission systems, equipment, subsystems, components, related support systems, and integrated logistic support elements; provides technical advice and assistance to the Naval Air Systems Command, the Board of Inspection and Survey, other agencies and contractors; assists other Research, Development, Test and Evaluation and Operational Test and Evaluation (T&E) activities; and, conducts in-house technical projects. This project funds facility costs not chargeable to the user. The Naval Air Test Center has extensive airfield, range and simulation laboratories.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

a. (U) Sustained support for maintenance and repair; support of simulation capabilities; realistic targets and threat Electronic Warfare (EW) emitter; Operations Security (OPSEC) administration; range operations and support functions.

b. (U) Completed procurement of the Manned Flight Simulator system radar target generator.

c. (U) Completed procurement of upgrades for the Compuscene IV System components for the Manned Flight Simulator.

d. (U) Completed installation of the Landing System Test Facility data acquisition and processing system.

e. (U) Completed installation of Real-time Telemetry Processing System streams Four, Five and Six.

f. (U) Completed procurement of Telemetry Data Systems Communications improvements and recording devices.

g. (U) Continued procurement and installation of Range EW System components.

h. (U) Installed fiber optic cable for the protection of range data and communications.

i. (U) Continued procurement and installation of Chesapeake Atlantic Tracking System (CATS) components.

j. (U) Continued procurement and installation of OPSEC improvements.

k. (U) Continued improvement in T&E Data Processing support functions.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605864N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Test and Evaluation Support
PROJECT NUMBER: WO654 PROJECT TITLE: Naval Air Test Center

l. (U) Continued the airfield runway repair program.
m. (U) Continued update of Electromagnetic Environmental Effects (E3) facility.

2. (U) FY 1991 Program:
a. (U) Continue support for maintenance and repair of facilities.
b. (U) Procure and integrate Target Command and Control System improvements.
c. (U) Continue improvements of the Range EW System components, maintenance of instrumentation data system and computers.
d. (U) Continue CATS improvements.
e. (U) Initiate procurement for the data computation and control system for the Range Operations Center.
f. (U) Continue OPSEC procurement and installation.
g. (U) Continue procurement of T&E Data Processing Equipment.
h. (U) Procure and install air anti-submarine warfare Interoperability Center (AASWIC) hardware components.
i. (U) Procure and install improved hardware components for aircraft weapon system test laboratories.
j. (U) Initiate procurement of integrated aircraft weapon system test components.
k. (U) Continue update of the E3 facility.
l. (U) Continue the airfield runway repair program.

3. (U) FY 1992 Plans:
a. (U) Continue support for maintenance and repair of facilities.
b. (U) Continue update of Target Command and Control Systems.
c. (U) Continue procurement of Range EW System components.
d. (U) Continue CATS improvements.
e. (U) Continue procurement for the data computation and control system for the Range Operations Center.
f. (U) Continue support for the AASWIC.
g. (U) Complete OPSEC procurement and installation.
h. (U) Continue procurement and installation of integrated aircraft weapon system test components.
i. (U) Continue improvement in T&E Data Processing.
j. (U) Continue update of the E3 facility.
k. (U) Continue the airfield runway repair program.

4. (U) FY 1993 Plans:
a. (U) Continue support for maintenance and repair of facilities.
b. (U) Continue Target Control Systems improvements.
c. (U) Continue the Range EW System improvements.
d. (U) Continue CATS improvements.
e. (U) Continue Range Operations System improvements.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605864N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Test and Evaluation Support
PROJECT NUMBER: WO654 PROJECT TITLE: Naval Air Test Center

f. (U) Continue support for AASWIC.
g. (U) Continue procurement and installation of integrated aircraft weapon systems test components.
h. (U) Continue improvements in Data Processing.
i. (U) Continue update of the E3 facility.
j. (U) Continue the airfield runway repair program.

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: PACMISTESTCEN, Point Mugu, CA; NAVAIRPROPCEN, Trenton, NJ; NAVWPNCEN, China Lake, CA; and NRL, Washington, D.C. CONTRACTORS: Southern Maryland Electric, Hughesville, MD; Dyncorp, Reston, VA; Grumman Corporation, Bethpage, NY; Universal Fuel, Lexington Park, MD, and Holmes & Narver, Inc. Orange County, CA.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
1. (U) Technology Changes: Not Applicable
2. (U) Schedule Changes: Not Applicable
3. (U) Cost Changes: The FY-91 decrease of $-6,013K will delay improvement and modernization initiatives and slow renovation of facilities.

F. (U) PROGRAM DOCUMENTATION: Not Applicable.

G. (U) RELATED ACTIVITIES: Provides support for Naval Aviation Squadrons VX-1, VQ-4, VXN-8; provides support for Naval Surface Weapons Center, Naval Aviation Depot Operations Center Naval Electronics System Engineering Activity and some 50 other tenant activities. Program Element 0604940D, Test Instrument Development: Development of a Common Airborne Instrumentation System, a multi-service project managed by Navy and NATC. Improvement and Modernization of Air Combat Environment Test and Evaluation components laboratories: Offensive Sensor Lab; Closed Loop Lab; Air Combat Environment Test and Evaluation Facility Operations and Control Center, Communications, Navigation and Identification Lab; Advanced Flight Simulator; Aircrew Systems Evaluation Facility.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U)MILCON	16,550	11,040	-	-	CONT	CONT

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605864N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Test and Evaluation Support
PROJECT NUMBER: W0655 PROJECT TITLE: Naval Air Propulsion Center

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0655	NAPC	23,439	24,892	25,117	24,223	CONT	CONT

B. (U) DESCRIPTION: Naval Air Propulsion Center (NAPC) provides complete technical and engineering support for air-breathing propulsion systems, including their accessories and components, and fuels and lubricants by: managing and performing applied research and development leading to new propulsion systems; conducting propulsion system tests and evaluation as necessary to ensure successful mission accomplishment and assisting in the determination of corrective action necessary for the resolution of operational service problems. NAPC has a Memorandum of Understanding (MOU) with the U.S. Army Aviation System Command, St. Louis, MO and the Arnold Engineering Development Center, Arnold Air Force Base, TN. These MOUs formalize a working relationship in the area of aircraft propulsion development testing and evaluation and in areas of information exchange. It defines mutually beneficial areas for management, technical interfaces, cooperation and establishes responsibilities.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

a. (U) Maintained and repaired physical plant facilities and equipment: installed eight new cooling pumps in exhaust wing; cleaned water side of 12 exhaust after coolers; completed test cell 2E exhaust diffuser modifications; completed temporary structural repairs on administrative/engineering building.

b. (U) System rehabilitation and modernization projects: replaced worn out instrumentation and measurement equipment including sensing devices and signal conditioning systems; office automation - procured additional computer work stations and provide training to users.

c. (U) Completed architectural and engineering studies for completion of installation of the fourth refrigeration system to increase present air and fuel chilling capacity.

d. (U) Data system replacement project: test cell 3E was outfitted with new data system and became operational.

2. (U) FY 1991 Program:

a. (U) Lease temporary facilities for personnel. The existing administrative/engineering building has been declared uninhabitable by Northern Division, Naval Facilities Engineering Command due to structural problems.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605864N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Test and Evaluation Support
PROJECT NUMBER: W0655 PROJECT TITLE: Naval Air Propulsion Center

b. (U) Maintenance and repair of RDT&E plant facilities and equipment: initiate cooling tower replacement; replace fire protection system in test wing; remove asbestos; replace exhauster header pit foundation deck; replace high-voltage circuit breakers in blower wing; replace exhauster rotors; maintenance of instrumentation data system and computers.

c. (U) Continue data system improvements.

3. (U) FY 1992 Plans:

a. (U) Sustain capabilities with maintenance and repairs and continue to procure equipment required to sustain plant operation and support engine testing.

b. (U) Lease temporary facilities for engineering and administrative personnel.

c.(U) Restore exhaust gas cooler capacity by replacing small engine test area gas coolers.

d. (U) Repair/reactivate small engine test area blower.

e. (U) Continue improvements of cooling system.

f. (U) Complete data system improvements.

g. (U) Initiate retubing of the 1E/2E exhaust gas coolers.

4. (U) FY 1993 Plans:

a. (U) Sustain capabilities with maintenance and repairs and continue to procure equipment required to sustain plant operation and support engine testing.

b. (U) Lease temporary facilities for engineering and administrative personnel.

c. (U) Replace deteriorating altitude test cell inlet header systems.

d. (U) Continue improvements of cooling system.

e. (U) Continue improvements of 1E/2E exhaust gas coolers.

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRPROPCEN, Trenton, New Jersey. CONTRACTORS: Metro Abatement Inc., Livingston, NJ; Allied Insulation Corporation, South River, NJ; National Corporate Disposal Inc., Hackensack, NJ; TUCS Cleaning Services Inc., West Orange, NJ; National Waste Disposal Inc., Trenton, NJ.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605864N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Test and Evaluation Support
PROJECT NUMBER: W0655 PROJECT TITLE: Naval Air Propulsion Center

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
1. (U) Technology Changes: Not Applicable.
2. (U) Schedule Changes: Not applicable.
3. (U) Cost Changes: The FY-91 decrease of $-1,014 will defer maintenance and repair efforts.

F. (U) PROGRAM DOCUMENTATION: Not Applicable.

G. (U) RELATED ACTIVITIES: None.

H. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE: Not Applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605864N **BUDGET ACTIVITY:** 6
PROGRAM ELEMENT TITLE: Test and Evaluation Support
PROJECT NUMBER: WO657 **PROJECT TITLE:** Naval Weapons Center

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
WO657	NWC	68,038	67,422	71,219	70,053	CONT	CONT

B. (U) DESCRIPTION: The Naval Weapons Center (NWC) (Ranges), China Lake, California, is the principal Navy National Range facility for the test and evaluation of airborne weapon systems, aircraft and weapon integration, weapons, components, parachute and aircraft escape system. Test capabilities include: air launched missile and aircraft ranges; rocket motor, warhead and other missile component test facilities; the Electronic Warfare Threat Environment Simulation (EWTES); and, a state-of-the-art Static Radar Cross Section (RCS) measurement facility. This project pays for all range operations, maintenance and improvement costs not directly associated with a specific user program.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:

a. (U) Continued improvement projects intended to sustain existing test capabilities: Operations Security (OPSEC); EWTES Instrumentation; RCS Range; Integrated Target Control System (ITCS) reliability and interoperability; ordnance test capabilities; aircraft/missile range electro-optical tracking; real-time processing, data communication and telemetry receiving instrumentation; parachute testing; and, telemetry development laboratory.

b. (U) Initiated a project at EWTES to acquire a stand alone telemetry receiving station.

c. (U) Completed facility preparations in anticipation of receipt of Global Position System (GPS)/Time, Space, Position Information (TSPI) equipment. The GPS/TSPI is required at EWTES in support of high priority Electronic Combat (EC) test programs.

d. (U) Provided improvements for static propulsion data acquisition; warhead optical instrumentation and environmental hydroshaker installation.

e. (U) Continued the data communications project on the aircraft/missile range to augment the oversaturated underground cable system.

f. (U) Completed design of real-time software for control and evaluation of flight test at EWTES.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605864N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Test and Evaluation Support
PROJECT NUMBER: WO657 PROJECT TITLE: Naval Weapons Center

2. (U) FY 1991 Program:

a. (U) Continue improvement projects intended to sustain existing test capabilities: OPSEC; EWTES Instrumentation; Range Communications System; Integrated Target Control System reliability and interoperability; RCS radar upgrades; ordnance test capabilities; aircraft/missile range electro-optical tracking; real-time processing, data communication and telemetry receiving instrumentation; parachute testing; and telemetry development laboratory.

b. (U) Complete the telemetry receiving station at EWTES.

c. (U) Complete the data communications project on the aircraft/missile range to augment the oversaturated underground cable system.

d. (U) Initiate the joint service of R-2508 Mosaic Direct Access Radar Channel (MDARC) upgrade.

3. (U) FY 1992 Plans:

a. (U) Continue improvement projects intended to sustain existing test capabilities: OPSEC; EWTES Instrumentation; Range Communications Systems; Integrated Target Control System reliability and interoperability; ordnance test capabilities; aircraft/missile range electro-optical tracking; real-time processing, date communication and telemetry receiving instrumentation; parachute testing; and telemetry development .

b. (U) Complete joint service R-2508 MDARC upgrade.

c. (U) Initiate a project to replace aging tracking mounts.

4. (U) FY 1993 Plans:

a. (U) Continue improvement projects intended to sustain existing test capabilities as per FY92 (paragraph a.).

b. (U) Complete the initial goals of the OPSEC project to provide the capability of conducting secure test operations.

c. (U) Continue to replace aging tracking mounts.

d. (U) Initiate procurement of a broadband very low RCS pylon to replace the existing pylon at the RCS range.

e. (U) Initiate improvement of the EWTES real-time data processing system.

5. (U) Program to Completion: This is a continuing program.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605864N **BUDGET ACTIVITY:** 6
PROGRAM ELEMENT TITLE: Test and Evaluation Support
PROJECT NUMBER: WO657 **PROJECT TITLE:** Naval Weapons Center

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVWPNCEN, China Lake, California. CONTRACTORS: ERAI, Ridgecrest, CA; COMARCO, Ridgecrest, CA; Computer Science Corporation; Ford Aerospace, Ridgecrest, CA; PanAm, Ridgecrest, CA.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not Applicable
2. (U) Schedule Changes: Not Applicable
3. (U) Cost Changes: The FY-91 decrease of $-8,244K which primarily reflects Congressional reductions will significantly delay the ongoing program to sustain and modernize test instrumentation and facilities needed to accommodate weapons test and evaluation program.

F. (U) PROGRAM DOCUMENTATION: Not Applicable.

G. (U) RELATED ACTIVITIES: New test capability development at NAVWPNCEN is supported by Program Element 0604940D, Test Instrumentation Development: Development of advanced design Anti-Radiation Missile (ARM) targets: Test Technology Development and demonstration: Development of Metric Infrared Imaging System.

H. (U) OTHER APPROPRIATION FUNDS: (DOLLARS IN THOUSANDS)

	FY 90 ACTUAL	FY 91 ESTIMATE	FY 92 ESTIMATE	FY 93 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) MILCON	-	17,585	-	-	CONT	CONT

I. INTERNATIONAL COOPERATIVE AGREEMENT: Not Applicable.

J. (U) MILESTONE SCHEDULE: Not Applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605864N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Test and Evaluation Support
PROJECT NUMBER: W2125 PROJECT TITLE: Test and Evaluation Modernization

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W2125	T&E Modernization	-	-	15,000	20,000	CONT	CONT

B. (U) DESCRIPTION: This project was previously funded under the Office of Secretary of Defense Central Test and Evaluation Improvement Program (CTEIP), Program Element (P.E.) 0604940D. Congressional language in the 1990 appropriations directed that certain CTEIP projects should be funded in the RDT&E accounts of the individual services. Following this direction, funding has been transferred to the Navy for those projects which are not multi-service. This high priority project provides for the modernization of major Navy test and evaluation assets and will provide for improvements at the Major Range and Test Facility Base (MRTFB) facilities to correct major deficiencies, improve Test and Evaluation (T&E) capabilities and increase T&E support effectiveness.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments:
   a. (U) This project was previously funded under P.E. 0604940D, CTEIP.

2. (U) FY 1991 Program:
   a. (U) This project was previously funded under P.E. 0604940D, CTEIP.

3. (U) FY 1992 Plans:
   a. (U) Provide a Navy Range Global Positioning (GPS) tracking system at four Navy MRTFB facilities. These activities are: Naval Air Test Center, Pacific Missile Test Center, Naval Weapons Center, and Atlantic Undersea Test and Evaluation Center. This system will: Provide expanded time space position information capabilities at the Navy ranges; provide interoperability with other Department of Defense ranges and provide instrumentation and ground equipment required to implement a GPS tracking capability.
   b. (U) Provide a Deep Water Range (DWR) at the Atlantic Undersea Test and Evaluation Center. The range 35x75 mile in size will provide capabilities presently unavailable, permitting testing of longer range systems requiring deeper waters such as new generation Anti-Submarine Warfare (ASW) Weapons, sensors, and combat systems.
   c. (U) Provide a Portable Tracking System capable of instrumenting 500 square mile underwater/in-air area in various deep-water and open ocean areas. This system will support test at diverse environment locations to realistically test modern ASW weapons.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605864N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Test and Evaluation Support
PROJECT NUMBER: W2125 PROJECT TITLE: Test and Evaluation Modernizatica

4. (U) FY 1993 Plans:
   a. (U) Continue the Navy GPS program.
   b. (U) Continue the Deep Water Research and Development Program.
   c. (U) Continue the Portable Tracking System Program.

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NUSC, Newport, RI, PACMISTESTCEN, Point Mugu, CA, NAVAIRTESTCEN, Patuxent River, MD, NAVWPNCEN, China Lake, CA. CONTRACTORS: To Be Determined.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET: Not Applicable

F. (U) PROGRAM DOCUMENTATION: Not Applicable.

G. (U) RELATED ACTIVITIES: Not Applicable.

H. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE: Not Applicable

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605865N **BUDGET ACTIVITY:** 6
PROGRAM ELEMENT TITLE: Operational Test and Evaluation Capability
PROJECT NUMBER: R0831 **PROJECT TITLE:** Operational T&E Force Support

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0831	Operational Test and Evaluation Force Support	7,190	6,348	8,038	8,947	Cont.	Cont.

B. (U) DESCRIPTION: This program element provides Commander, Operational Test and Evaluation Force general support funding for the planning, conducting, and reporting of operational test and evaluation of Navy weapon systems acquisition projects, as directed by the Chief of Naval Operations, and the development and validation of tactics to enhance tactical employment of the systems. Reports are made directly to the Chief of Naval Operations and the Secretary of the Navy. Operational test and evaluation of new weapon systems and the development and evaluation of tactics are required by directives of Secretary of Defense and by Public Law 98-94, among others. The level of effort is projected to continue to increase due to more stringent requirements from the Congress and the Secretary of Defense for more realistic operational test and evaluation.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS: Issued operational test evaluation reports to the CNO and SECNAV reflecting Operational Test results, conclusions, and recommendations in support of production decisions and Fleet introduction decisions for new weapon systems.

2. (U) FY 1991 PROGRAM: To operationally test and evaluate Chief of Naval Operations projects commensurate with authorized funding level.

3. (U) FY 1992 PLANS: To operationally test and evaluate Chief of Naval Operations projects commensurate with authorized funding level.

4. (U) FY 1993 PLANS: To operationally test and evaluate Chief of Naval Operations projects commensurate with authorized funding level.

5. (U) PROGRAM TO COMPLETION: This is a continuing project.

D. (U) WORK PERFORMED BY: IN-HOUSE: COMOPTEVFOR, Norfolk, VA; NAVWPNCEN, China Lake, CA; and COMPACMISTESTCEN, Point Mugu, CA. CONTRACTOR: PRC, Norfolk, VA.

E. (U) RELATED ACTIVITIES: Not applicable.
F. (U) OTHER APPROPRIATION FUNDS: Not applicable.
G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605866N **BUDGET ACTIVITY:** 5
PROGRAM ELEMENT TITLE: Navy C^2 Planning Development
PROJECT NUMBER: R0739 **PROJECT TITLE:** Navy C^2 Top Level Warfare Requirements

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY1990 ACTUAL	FY1991 ESTIMATE	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0739	Navy C^2 Top Level Warfare Requirements	3,030	2,983	3,082	3,036	Cont.	Cont.

B. (U) DESCRIPTION: This program element analyzes fleet requirements, documented operational deficiencies, and R&D technology to develop top level plans for operating Navy command and control systems.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS: Provided a top level analysis of current and future Navy Command, Control, and Communication Information (C^3I) requirements and capabilities by examining communications connectivity, tactical intelligence needs, and the C^3I objectives and requirements of the Fleet CINCs. Determined quantitative and statistical measurements of Navy message traffic to be used in C^3 planning, C^3 architecture and engineering, C^3 modeling, and telecommunications modernization. Developed recommendations for the use of space for submarine communications and over-the-horizon targeting. Continued feasibility study for VLF transmitter in space to support strategic connectivity.

2. (U) FY 1991 PROGRAM: Identify the technologies, systems, and tactics required to conduct the counter communications, counter surveillance, and counter targeting aspects of Space and Electronic Warfare (SEW). Develop a Navy C^3 R&D strategy that will identify technological advancements needed for the C^3 systems of the future. Develop a rapid prototype (RP) approach to integrating C^3I/Space systems. Continue development of Navy C^3 plans and investigation of promising technologies for naval C^3 applications.

3. (U) FY 1992 PLANS: Extend SEW planning to a stealth environment. Relate the effects of changing surface ship force structure to Navy Command and Control System (NCCS) Ashore and Afloat requirements. Continue development of Navy C^3 plans and investigation of promising technologies for naval C^3 applications.

4. (U) FY 1993 PLANS: Continue to study, assess, and refine Navy C^3 requirements resulting from earlier work in this program and from fleet inputs. Continue development of Navy C^3 plans.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVWPNCEN, China Lake, CA; NRL, Washington, DC; NAVOCEANSYSCEN, San Diego, CA; NAVPGSCOL, Monterey, CA. CONTRACTORS: Johns Hopkins University Applied Physics Laboratory, Laurel, MD; International Research Institute, Norfolk, VA.
E. (U) RELATED ACTIVITIES: PE 0603763N, Warfare Systems Architecture and Engineering.
F. (U) OTHER APPROPRIATED FUNDS: Not applicable.
G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0605867N Budget Activity: 4
Program Element Title: C2 Surveillance/Reconnaissance Support

A. (U) RESOURCES: (Dollars in Thousands)

Project Number	Title	FY 1990 Actual	FY 1991 Estimate	FY 1992 Estimate	FY 1993 Estimate	TO COMP	Total Prog
T1034	TAC SAT RECON OFFICE	9,054	7,924	14,302	13,340	Cont	Cont
R2007	SPACE MGT SUPPORT	1,086	1,179	1,160	1,173	Cont	Cont
X1368	NAV SPACE SYS ACT LA	291	310	307	309	Cont	Cont
	TOTAL	10,431	9,413	15,769	14,822	Cont	Cont

B. ( ) DESCRIPTION: C2 Surveillance/Reconnaissance Support provides resources for Tactical Satellite Reconnaissance, commonly know as Tactical Exploitation of National Capabilities (TENCAP). This unique, low-cost, high payoff project was established by Congress in 1977.

The Space Management Support project supports various Navy space research and developement projects and space systems testing. The Navy Space Systems Activity project is an activity located in Los Angles and plays the role of primary field support activity to the Navy Space Program Office.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605867N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: C2 Surveillance/Reconnaissance Suport
PROJECT NUMBER: T1034 PROJECT TITLE: TAC SAT RECON OFFICE

A. RESOURCES (U): (Dollars in thousands)

Project Number	Title	FY 1990 Actual	FY 1991 Estimate	FY 1992 Estimate	FY 1993 Estimate	TO COMP	Total Prog
T1034	TAC SAT RECON OFFICE	9,054	7,924	14,302	13,340	Cont.	Cont.

B. (U) DESCRIPTION: Established by Congressional direction to exploit all available National and Service sensor systems for tactical support to fleet operational commanders. Project also provides support to fleet exercises, which provides the background for development of modifications to existing programs and assists in establishing/validating requirements for new programs.

C. ( ) PROGRAM ACCOMPLISHMENTS AND PLANS:
1. ( ) FY 1990 Accomplishments:
a. ( )

b. ( )

c. ( )

d. ( )

2. ( ) FY 1991 Program:
a. ( )

b. ( )

c. ( )

d. ( )

e. ( )

PROGRAM ELEMENT: 0605867N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: C2 Surveillance/Reconnaissance Suport
PROJECT NUMBER: T1034 PROJECT TITLE: TAC SAT RECON OFFICE

3. ( ) FY 1992 Plans:
a. ( )

b. (U) Test experimental sensors on the space shuttle and piggy-backed with LIGHTSAT payloads.
c. ( )

d. ( )

e. ( )

f. ( )

4. ( ) FY 1993 Plans:
a. ( )

b. (U) Continue testing experimental sensors on the space shuttle and piggy-backed with LIGHTSAT payloads.
c. ( )

d. ( )

e. ( )

f. ( )

g. ( )

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: Work performed under compartmented contracts.

PROGRAM ELEMENT: 0605867N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: C2 Surveillance/Reconnaissance Suport
PROJECT NUMBER: T1034 PROJECT TITLE: TAC SAT RECON OFFICE

E. ( )

1. (U) Technology Changes: None.

2. (U) Schedule Changes: None.

3. (U) Cost changes: None.

F. (U) PROGRAM DOCUMENTATION: NONACAT

G. (U) RELATED ACTIVITIES: PE 0603451N Tactical Space Operations.

H. (U) OTHER APPROPRIATION FUNDS: None.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

J. (U) MILESTONE SCHEDULE: None.

FY 1992 RDT&E, NAVY DESCRIPTIVE SUMMARY
PROGRAM ELEMENT: 0605867N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: C2 Surveillance/Reconnaissance Support
PROJECT NUMBER: R2007 **PROJECT TITLE:** SPACE MGMT SUPPORT

C. (U) DESCRIPTION: This project provides resources to the Naval Space Command for the conduct of its support to various Navy space research and development projects and space system testing.

D. ( ) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. ( ) FY 1990 Accomplishments:

a. ( )

2. (U) FY 1991 Program:

a. (U) Evaluate advanced technology and commence prototypin a system for tactical integration of space-derived information

b. (U) Explore applications of optical interferometry for precise space object location.

c. (U) Evaluate tactical utility of advanced space sensors and alternate C3 architectural options for space support to the fleet.

3. (U) FY 1992 Plans:

a. (U) Complete prototyping and commence test and demonstration of system for tactical integration of space-derived information.

b. (U) Commence prototyping of optical interferometry equipment for precise space object location.

c. (U) Conduct detailed engineering assessments of identified C3 architectural options for space support to the fleet.

4. (U) FY 1993 Plans:

a. (U) Complete test and demonstration of system for tactical integration of space-derived information.

b. (U) Complete prototyping and commence test and demonstration of optical interferometry equipment for precise space object location.

c. (U) Commence prototyping of equipment to provide most cost effective C3 architecture for space support to the fleet.

d. (U) Conduct detailed engineering assessments of identified space sensors.

5. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: Naval Surface Weapons Center (NSWC), Dahlgren, VA, Naval Research Laboratory (NRL), Washington, D.C., Level of Effort (LOE) Contractor

F. (U) RELATED ACTIVITIES: PE 0102427N, Project X0125, Naval Space Surveillance; PE 0605867N, Project T1034, Tactical Satellite Reconnaissance Office.

G. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

FY 1992 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605867N BUDGET ACTIVITY 4
PROGRAM ELEMENT TITLE: C2 Surveillance/Reconnaissance Support
PROJECT NUMBER: X1368 PROJECT TITLE: NAV SPACE SYS ACT LA

C. (U) DESCRIPTION: This project provides support for the Navy Space Systems Activity, Los Angeles, CA, for the conduct of its mission and functions in its role as primary field support for the Navy Space Project.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS:
a. (U) Continued management, security, financial system analysis and computer service support to various Navy space and space-related programs.

2. (U) FY 1991 PROGRAM:
a. (U) Continue financial systems analysis, computer services and administrative efforts to support Navy space programs.
b. (U) Continue support in management and security.

3. (U) FY 1992 PLANS:
a. (U) Continue financial systems analysis, computer services and administrative efforts to support Navy space programs.
b. (U) Continue support in management and security.

4. (U) FY 1993 PLANS:
a. (U) Continue support to various Navy space and space-related programs.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: In-house: Naval Space Systems Activity, Los Angeles. CA.

F. (U) RELATED ACTIVITIES: PE 0603451N, Tactical Space Operations.

G. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605871M BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Marine Corps Tactical Exploitation of National Capabilities
PROJECT NUMBER: C1424 PROJECT TITLE: Tactical Exploitation of National Capabilities (TENCAP)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C1424	TENCAP	1,380	1,856	1,153	1,306	CONT.	CONT.

B. (U) DESCRIPTION: This program is designed to enhance the ability of tactical Marine Corps forces to exploit the capabilities of national intelligence gathering systems. Congressionally directed, it requires close liaison with the intelligence community and involves complex and highly-sensitive activities.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 Accomplishments: Prepared Tactical Impact Statements (TIS) for three future national systems. Co-sponsored planning for JCS directed TENCAP Special Project 1991. Fielded intelligence collection management and secondary imagery dessimination equipment for test and evaluation. Rewrote the Marine Corps Master Intelligence Plan.

2. (U) FY 1991 Program: Participate in national intelligence systems development (NISD). Submit TIS. Pursue emerging technology with Defense Special Project Office (DSPO) and other services to ensure Marine tactical forces fit the Warfighting CINCs intelligence architecture plans. Update the Marine Corps Imagery Intelligence Plan (MCIIP) and TENCAP Plan.

3. (U) FY 1992 Plans: Participate in NISD and technology assessments with DSPO. Submit TIS. Participate in JCS Corrective Actions Review Committee. Revise USMC Master Plan.

4. (U) FY 1993 Plans: Participate in NISD and technology assessments with DSPO. Submit TIS. Participate in JCS Corrective Actions Review Committee. Update USMC Master Plan.

5. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: SPAWAR, Washington, DC; NSSC (NAVSUP), Washington, DC; NOSC, San Diego, CA. CONTRACTORS: NONE.

E. (U) RELATED ACTIVITIES: NONE.

F. (U) OTHER APPROPRIATION FUNDS: NONE.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605872N **BUDGET ACTIVITY:** 6
PROGRAM ELEMENT TITLE: Productivity Investment
PROJECT NUMBER: S2006 **PROJECT TITLE:** Productivity Investment

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S2006	Productivity Investment	658	711	534	433	0	5,805

B. (U) DESCRIPTION: This program provides for productivity enhancing capital investments at specified research and development laboratories. It supports development, purchase and/or implementation of improved equipment, facilities, procedures and labor quality, and alters the work environment to produce man-year savings and reduce costs while improving capabilities of Navy's RDT&E mission.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS: Automation of Ordinance Alteration (ORDALT) Instructions to allow for a completed ORDALT Instruction in a digital medium; serve as Navy Expert System Commodity Manager Assistant.

2. (U) FY 1991 PROGRAM: Develop an equipment diagnostic expert system shell to assist Naval Repair Depot personnel in repairs.

3. (U) FY 1992 PLANS: Purchase hardware and software for Computer Aided Engineering Facility; purchase, installation, and training for a plastics injection molding machine; develop acoustic emission system for on-board testing and recertification of high pressure gas flasks.

4. (U) FY 1993 PLANS: Develop and procure a simulator for the Landing Gear Test System; upgrade the Combat Systems DITMCO Analyzer Test Station

5. (U) PROGRAM TO COMPLETION: Program is completed in FY 1993.

D. (U) WORK PERFORMED BY: IN-HOUSE: Naval Ship Weapons Systems Engineering Station, Port Hueneme, CA; Naval Surface Warfare Center, Dahlgren, VA; Naval Air Engineering Center, Lakehurst, NJ; Naval Undersea Warfare Engineering Station, Keyport, WA.; Puget Sound Naval Shipyard, Bremerton, WA. CONTRACTOR: Dialog Systems Division, A.T. Kearney, Inc., Lansing MI.

E. (U) RELATED ACTIVITIES: None.
F. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.
G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0708011N **BUDGET ACTIVITY:** 6
PROGRAM ELEMENT TITLE: Industrial Preparedness
PROJECT NUMBER: R1050 **PROJECT TITLE:** Manufacturing Technology

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1990 ACTUAL	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R1050	MANTECH	48,456	109,727	25,302	46,591	Cont.	Cont.

B. (U) DESCRIPTION: The Navy Manufacturing Technology program is intended to improve the productivity and responsiveness of the U.S. defense industrial base by funding the development of manufacturing technologies. The Navy program, by providing seed funding for the development of moderate to high risk process and equipment technology, permits contractors to upgrade their manufacturing capabilities. Ultimately, the program aims to produce high-quality weapon systems with shorter lead times and reduced acquisition costs. Major areas of endeavor both underway and planned include: electronics assembly, laser metal working, flexible machining, computer integrated manufacturing, advanced composites manufacturing, automated ship propeller manufacturing, repair technology for aircraft, and advanced metalworking technologies. Additional applications being planned include the establishment of a Navy Computer Aided Acquisition and Logistics Support Center of Excellence, Product Model/Product Data Transfer, and Flexible Manufacturing Technologies.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1990 ACCOMPLISHMENTS: Established Navy Composites Manufacturing Center of Excellence. Demonstrated new manufacturing process for bomb suspension lugs. Initiated metalworking thrust in powder metallurgy. Demonstrated Circuit Card Assembly and Processing System. Demonstrated an unattended fully automated flexible turning workstation at Mare Island Naval Shipyard. Developed manufacturing process for Aluminum Nitride electronics package. Demonstrated software tool to aid companies make automation decisions easier. Relocated Electronics Manufacturing Productivity Facility (EMPF) to the Naval Avionics Center Indianapolis, IN.

2. (U) FY 1991 PROGRAM: Demonstrate at the Automated Manufacturing Research Facility (AMRF) the architecture and concepts necessary for the "seamless" processing of part description data through process planning, numerically controlled code generation, robot path creation, inspection plan generation and material handling. Demonstrate the technology for quality control in the unmanned small batch size environment by developing technology for deterministic metrology. Complete strategic plan for Navy Manufacturing Technology Program. Demonstrate laser welding of propulsor blades. Complete the Integrated Computer Aided Manufacture of Propeller program. Demonstrate manufacturing process to clad fiber optic microcable. Demonstrate sub-micron resist technology.

PROGRAM ELEMENT: 0708011N BUDGET ACTIVITY: 6 Defense-wide Mission Supp
PROGRAM ELEMENT TITLE: Industrial Preparedness
PROJECT NUMBER: R1050 PROJECT TITLE: Manufacturing Technology

Demonstrate enhanced thermal performance composite materials. Demonstrate improved manufacturing process for ausrolling gears. Continue manufacturing process development for tungsten Phalanx penetrator. Continue development of advanced composite manufacturing technology. Continue development of advanced metalworking manufacturing technology. Continue work on Congressionally directed efforts in Electroslag Welding, Casting of Projectiles, and Powder Metallurgy. Implement new Congressional efforts in Spray Metal Forming, Acquisition Training, Next Generation Shipbuilding Technology, Strategic Materials Research and Advanced Design for Polymer Composites.

3. (U) FY 1992 PLANS: The major change from FY 1991 and FY 1992 is the functional transfer of the EMPF. Continue development of advanced composite manufacturing technology. Continue development of advanced metalworking manufacturing technology. Continue development of intelligent automation technology. Continue development of advanced electronic assembly manufacturing technology. Demonstrate artificial intelligent welding technology. Demonstrate computer numerically controlled thermal spray technology for application to ship and submarine components. Demonstrate cast ductile iron manufacturing technology for projectiles. Continue support of National Shipbuilding Research Program. Initiate advanced propulsion manufacturing technology projects.

4. (U) FY 1993 PLANS: Continue development of advanced composite manufacturing technology. Continue development of advanced metalworking manufacturing technology. Continue development of intelligent automation technology. Continue development of advanced electronic assembly manufacturing technology. Participate in the development of new interface and communications standards relating to manufacturing. Further develop and successfull demonstrate concepts of product model development and transfer. Initiate advanced flexible manufacturing projects. Accelerate the implementation of the Computer Aided Acquisition and Logistics Support Center of Excellence.

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVOCEANSYSCEN, San Diego, CA; DTRC, Bethesda, MD; NRL, Washington, DC; NAVSWC, Silver Spring, MD; NAVSWC, Dahlgren, VA; NAVWPNSUPPCEN, Crane, IN; NAVWPNCEN, China Lake, CA; National Institute of Standards & Technology, Gaithersburg, MD; CONTRACTORS: Hughes Aircraft Co., Los Angeles,CA; McDonnell Douglas Aircraft Corporation, St. Louis, MO; IBM, Owego, NY; Robotic Vision Systems, Hauppauge, NY; Metalworking Technology Inc., Johnstown, PA, Great Lakes Composites Consortium, Kenosha, WI.

E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Congressional add-on has added several new starts to MANTECH program.

PROGRAM ELEMENT: 0708011N **BUDGET ACTIVITY:** 6 Defense-wide Mission Supp
PROGRAM ELEMENT TITLE: Industrial Preparedness
PROJECT NUMBER: R1050 **PROJECT TITLE:** Manufacturing Technology

2. (U) SCHEDULE CHANGES: None.
3. (U) COST CHANGES: None.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U). RELATED ACTIVITIES: This is the only Navy program element which funds Manufacturing Technology. The Army and the Air Force also have Manufacturing Technology programs in the same Program Element 0708011. A separate OSD line item was established in FY91.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands) Not Applicable

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable

J. (U) MILESTONE SCHEDULE: Not Applicable

Program Element: 0708011N Title: Industrial Preparedness
DOD Mission Area: 480 Budget Activity: 6

Procurement Appropriation Supported

Project (Title)
I.D. (End Item Supported)

		FY-90 Actual	FY-91 Actual	FY-92 Estimate	FY-93 Estimate	Additional To Completion	Total Estimate Costs
SHIPBUILDING AND CONVERSION, NAVY							
M 0512	Flexible Mfg. Systems for Small Batch Metal Parts (All Ship Construction)	3546	4500	3823	3000	Continuing	Continuing
S 1101	Propeller Integrated Computer Aided Mfg. (Ship Construction and Overhaul)	2000	1500	200	0	0	3700
S 1109	Robotic Adaptive Welding System (RAWS) (All Ship Construction)	15	0	0	0	0	15
S 1218	National Shipbuilding Research Program (All Ship Construction)	1200	1775	0	2000	Continuing	Continuing
M 0538	Plasma Arc-CNC Machining Cell (Ship Repair/Overhaul)	208	100	0	0	0	450
M 0543	Congressionally Directed Shipbuilding Projects (HY Steel Dev. and Electroslag Welding) (All Ship Construction and Repair)	800	3000	0	0	0	4380
M 0544	Next Generation Shipbuilding Technology (All Ship Construction)	0	24000	0	0	0	24000
M 0545	Spray Metal Forming (All Ship Construction)	0	5000	0	0	0	4000
M 0549	Advanced Propulsor Manufacturing Technology (All Ship Construction)	0	1000	0	3500	Continuing	Continuing
S 1413	Laser Cladding of Valve Components (All Ship Construction)	100	100	0	0	0	200
	TOTAL SUPPORT FOR SHIPBUILDING AND CONVERSION, NAVY	**7869**	**40975**	**4023**	**8500**	**Continuing**	**Continuing**

FY1992/1993 MANUFACTURING TECHNOLOGY PROGRAM

Program Element: 0708011N Title: Industrial Preparedness
DoD Mission Area: 480 Budget Activity: 6

Procurement Appropriation Supported

Project (Title)
I.D. (End Item Supported)

		FY-90 Actual	FY-91 Actual	FY-92 Estimate	FY-93 Estimate	Additional To Completion	Total Estimate Costs
AIRCRAFT PROCUREMENT, NAVY							
X 0407	Circuit Card Assembly and Processing System (AN/AYK-14, UYS-1, EMSP, SUBACS, VHSIC)	7376	1000	0	0	0	61453
X 0504	Integrated Mfg. Electronic Packaging (EMSP, AN/UYS-1, AN/APG-65, VHSIC)	1589	1000	0	1000	0	9710
X 0501	Advanced Integrated Circuit/VHSIC MT (Navy Electronic System)	1800	1500	0	1000	0	13350
X 0903	Masked Ion Beam Lithography (Navy Electronic Systems)	30	0	0	0	0	2754
X 0972	Heat Pipes, MT (Navy Electronic Systems)	147	0	0	0	0	2029
A 2010	Advanced Repair Technologies for A/C Rework Applications (All Navy Aircraft)	1750	2500	0	3000	Continuing	Continuing
A 2011	Cost Effective Manufacture of Airframe Structures and A/C Components (All Navy Aircraft)	1950	3500	0	3000	Continuing	Continuing
	TOTAL FOR SUPPORT OF AIRCRAFT PROCUREMENT, NAVY	**14642**	**9500**	**0**	**8000**	**Continuing**	**Continuing**
WEAPONS PROCUREMENT, NAVY							
S 0806	MT For Laser Assisted Metalworking (Guns, Missiles, and Launchers)	1650	2500	0	1500	Continuing	Continuing
M 0521	Modern Casting Technology for Projectiles (Navy Gun Projectiles)	1000	6000	0	800	Continuing	Continuing

Program Element: 0708011N Title: Industrial Preparedness
DoD Mission Area: 480 Budget Activity: 6

Procurement Appropriation Supported

Project (Title)
I.D. (End Item Supported)

		FY-90 Actual	FY-91 Actual	FY-92 Estimate	FY-93 Estimate	Additional to Completion	Total Estimate Costs
WEAPON PROCUREMENT, NAVY (CONT'D)							
S 1407	MT For Fiber Optic Microcable (MK 48, Wire Guided Torpedos)	800	1000	0	0	0	2300
A 0014	Single Crystal Sapphire Domes (Sidewinder, ASAAM)	250	0	0	0	0	640
	TOTAL FOR SUPPORT OF WEAPONS PROCUREMENT, NAVY	**3700**	**9500**	**0**	**2300**	**Continuing**	**Continuing**
OTHER PROCUREMENT, NAVY							
M 0511	Electronics Manufacturing Productivity Facility	0	0	4250	3825	Continuing	Continuing
M 0522	Metalworking Productivity Facility (Generic Technology for All Navy Systems)	5300	9800	6000	6000	Continuing	Continuing
M 0529	Composites Manufacturing Center of Excellence (Generic Technology for All Navy Systems)	4600	6000	7000	9000	Continuing	Continuing
M 0422	Missile and Torpedo Shells from Spun SiC/Al (Advanced Missiles and Torpedos)	15	150	0	0	0	1790
M 0523	Superconductivity (Advanced Navy Systems)	400	400	0	0	0	2350
M 0528	Submicron Resist MT (Navy Electronic Systems)	1500	1700	0	265	0	4765
M 0526	A/I for Welding (Generic Technology for All Navy Systems)	1100	1130	0	0	0	2400
M 0527	Advanced Composites Manufacture for Improved Thermal Management (All Navy Weapon Systems)	2650	4000	0	4000	4000	20000
M 0532	MT for High Thermal Conductivity Fibers (Advanced Navy Systems)	232	200	0	0	0	575

Program Element: 0708011N Title: Industrial Preparedness
DoD Mission Area: 480 Budget Activity: 6

Procurement Appropriation Supported

Project Title)
I.D. (End Item Supported)

		FY-90 Actual	FY-91 Actual	FY-92 Estimate	FY-93 Estimate	Additional to Completion	Total Estimate Costs
OTHER PROCUREMENT, NAVY (CONT'D)							
M 0540	Ausrolling for Gears (Aircraft Engines and Torpedos)	550	920	0	400	0	2470
M 0546	Acquisition Training (All Navy Weapon Systems)	0	3000	0	0	0	3000
M 0547	Advanced Design for Polymer Composites Manufacturing (Generic Technology for All Navy Systems)	0	5400	0	0	0	5400
M 0548	Powder Metallurgy (Generic Technology for All Navy Systems)	2000	3000	0	0	Continuing	Continuing
M 0550	Strategic Materials, Manufacturing Technology (Generic Technology for All Navy Systems)	0	8900	0	0	0	8900
	TOTAL FOR SUPPORT OF OTHER PROCUREMENT, NAVY	**18347**	**44600**	**17250**	**23490**	**Continuing**	**Continuing**
MT PROJECT SUPPORT		**3898**	**5152**	**4029**	**4301**	**Continuing**	**Continuing**
TOTAL NAVY		**48456**	**109727**	**25302**	**46591**	**Continuing**	**Continuing**

SECTION II

CONSTRUCTION AT RDT&E,N FACILITIES

MAJOR IMPROVEMENTS TO AND CONSTRUCTION OF GOVERNMENT-OWNED FACILITIES FUNDED BY RDT&E

The data provided by this exhibit includes the following:

Part I - Utilization of Section 2353, Title 10 Authority - Specialized R&D Facilities and/or Equipment Constructed by or Furnished to Contractors

SECTION I - Projects accomplished or underway

SECTION II - Projects planned or projected.

Part II - Utilization of RDT&E for Facilities at Government-Owned/Government-Operated Installations

SECTION I - Projects accomplished or underway

SECTION II - Projects planned or projected

Part III - Utilization of RDT&E Appropriation for Minor Construction

DEPARTMENT OF DEFENSE, MILITARY
RDT&E, NAVY
MAJOR IMPROVEMENTS TO AND CONSTRUCTION OF GOVERNMENT-OWNED FACILITIES FUNDED BY RDT&E

Part I. UTILIZATION OF SECTION 2353, TITLE 10 AUTHORITY

Specialized R&D facilities and/or equipment determined to be necessary for the performance of a contract for a Military Department for research and development may be constructed by or furnished to the contractor and funded from appropriations available for research, development, test and evaluation. The Congress enacted this legislation, now 10 USC 2353, in 1956. This policy is executed through DOD Directive 4275.5. Under this policy, the Secretaries of the Military Departments or their designees, and the Directors of Defense Agencies may approve facilities projects up to $3,000,000; the Under Secretary of Defense (Acquisition) approves projects exceeding $3,000,000. The Congress is notified in advance of starting any project involving construction, regardless of the dollar amount. The table below provides a summary listing of all such projects accomplished in FY-90 and planned in FY-91, FY-92, and FY-93.

FACILITY/EQUIPMENT	RDT&E,N PE/PROJ NUMBER	CONTRACTOR	LOCATION	TOTAL OBLIGATION AUTHORITY (THOUSANDS OF DOLLARS) FY90	FY91	FY92	FY93
SECTION I PROJECTS ACCOMPLISHED OR UNDERWAY							
None identified.							

FACILITY/EQUIPMENT	RDT&E,N PE/PROJ NUMBER	CONTRACTOR	LOCATION	TOTAL OBLIGATION AUTHORITY (THOUSANDS OF DOLLARS) FY90	FY91	FY92	FY93
		SECTION II PROJECTS PLANNED OR PROJECTED					
60 HZ Switchboard 1/	0604567N S0857	International Switchboard Corp.	NAVSSES Philadelphia, PA	200	-	-	-
Electromagnetic 2/ A/C Launch System	0603512N W1723	TBD	NAEC Lakehurst, NC.	-	1,000	-	9,300
Total - Part I				$200	$1,000	-	$9,300

1/ Previously listed in the Dept of the Navy, Supporting data for FY-91 Budget Estimates Descriptive Summaries, dated January 1990

2/ Initial Listing

MAJOR IMPROVEMENTS TO AND CONSTRUCTION OF GOVERNMENT-OWNED FACILITIES FUNDED BY RDT&E

Part II. UTILIZATION OF RDT&E,N APPROPRIATION FOR FACILITIES AT GOVERNMENT-OWNED/GOVERNMENT-OPERATED INSTALLATIONS

Chapter 251 of the DOD Budget Guidance Manual (which was approved by the GAO as DOD Instruction 7220.5) provides that RDT&E appropriations may finance the development, design, purchase, and installation (including directly related foundations, shielding, environmental control, weather protection, structural adjustments, utilities and access) of equipment or instrumentation required for research, development, test and evaluation activities. The table below provides a summary listing of all such projects for the installation of equipment, where the cost of installation is $200,000 or more, accomplished in FY-90 and planned in FY-91, FY-92, and FY-93.

FACILITY/EQUIPMENT	RDT&E,N PE/PROJ NUMBER		LOCATION	TOTAL OBLIGATION AUTHORITY (THOUSANDS OF DOLLARS) FY90	FY91	FY92	FY93
			SECTION I PROJECTS ACCOMPLISHED OR UNDERWAY				
Electric Power Distribution 1/	0604567N S0857	Naval Ship Systems Engineering Station,	Philadelphia, PA	100			
Propulsor Prototype 2/	0604561N S1946		DOE/Oak Ridge Oak Ridge, TN	11,540 3/	6,240	-	-
Large Cavitation Channel (LCC) 1/	0605862N X1957		CBI Nuclear Co. Facility Memphis, TN	15,058	4,810	4,753	- 4/

1/ Previously listed in the Dept of the Navy, Supporting data for FY 1991 Budget Estimates Descriptive Summaries, dated January 1990
2/ Initial Listing
3/ DD 1391 Attached for alteration costs associated with this effort, $7.27M.
4/ Funding transferred to MILCON in FY-93 and out.

FACILITY/EQUIPMENT	RDT&E,N PE/PROJ NUMBER	CONTRACTOR	LOCATION	TOTAL OBLIGATION AUTHORITY (THOUSANDS OF DOLLARS) FY90	FY91	FY92	FY93
SECTION II **PROJECTS PLANNED OR PROJECTED**							
Plant Automation/Install Equip/Test System Replacement 1/	0605864N W0655	Naval Air Propulsion Center	Trenton, N.J.	-	680	2,800	- 2/
TOTAL, PART II				26,698	11,730	7,553	-

1/ Previously listed in the Dept of of the Navy, Supporting data for FY 1991 Budget Estimates Descriptive Summaries, dated January 1990

2/ Funding transferred to MILCON in FY-93 and out.

LARGE CAVITATION CHANNEL

DAVID TAYLOR RESEARCH CENTER Bethesda, MD
(CBI NUCLEAR COMPANY FACILITY, MEMPHIS, TN)

(THOUSANDS OF DOLLARS)			
FY90	FY91	FY92	FY93
15,058	4,810	4,753	-

DESCRIPTION OF PROJECT:
This project was started in FY 1987 and will be ready for operations in late FY 1991. The Large Cavitation Channel (LCC) will be a ship and model testing similar to a wind tunnel except that it will be filled with water. The overall size of the circuit will be 65 feet in height and 239 feet in length. Its primary function will be to test models of ship and submarine hulls together with their propulsors and appendages to meet increasing stringent U. S. Navy requirements for improved propulsive quietness and efficiency. Within the circuit, the test section size will be 10 x 10 x 40 feet, which will allow a large enough model for accurate scaling without excessive distortion of the flow due to the channel walls. The channel will be completed in time for the design of the next generation ships. The facility is a David Taylor Research Center field activity.

The major non-servable items included in the project and the dollar values are as follows:

Item	Value (Thousands of Dollars)
Channel circuit	33,510
Pump and drive machinery	9,582

There are no major severable items.

The David Taylor Research Center has signed contract number N00167-87-C-0088 with CBI Na-Con, Inc. for design, fabrication, and installation of the LCC. The LCC will support RDT&E on all classes of ships in the Navy and all future classes into the next century, including the SSN 21. Pertinent schedule dates are as follows:

FY 1986: Issued Request for Proposals and received proposals.

FY 1987: Evaluated proposals, negotiated and awarded contract, began engineering design based on Government-Furnished Design.

FY 1988: Initiated civil improvements at Memphis, TN; established LCC Site as detachment of DTRC; and completed delivery of 14,000 HP pump motor controls.

LARGE CAVITATION CHANNEL (Continued)

FY 1989: Completed LCC acoustic trench concrete work: initiated intersection of stainless steel channel in acoustic trench; and complete all civil improvements. LCC field installation.

FY 1990: Complete LCC installation.

FY 1991: Complete acceptance testing and initial calibration, and initiate LCC operation.

FY 1992: Continue LCC operations under realty lease agreement.

FY 1993: Transferred to Military Construction, Navy Appropriation.

MAJOR IMPROVEMENTS TO AND CONSTRUCTION OF GOVERNMENT-OWNED FACILITIES FUNDED BY RDT&E

PART III. UTILIZATION OF RDT&E,N APPROPRIATION FOR MINOR CONSTRUCTION

For in-house installations, construction projects in support of R&D for $200,000 or less are funded from the RDT&E appropriation. Such expenditures are authorized by 10 USC 2805 and the applicable provisions of the current DOD Appropriation Act. Under this procedure, project approval at this level is authorized by the Major Command concerned, or delegated to R&D installation commanders as appropriate. The table below provides a summary total of such major construction accomplished in FY-90 and the estimated amounts planned for FY-91 and FY-92. In FY-93, all minor construction was transferred to the MILCON appropriation. All minor construction must result in a complete and useable facility. In no event are two or more minor construction projects or minor and major construction projects to be contrived to form a useable facility.

SUMMARY OF MINOR CONSTRUCTION FUNDED BY RDT&E, NAVY
(Thousands of Dollars)

	FY 90	FY 91	FY 92	FY93	
Total, Part III	6,978	9,426	11,061	0	1/
GRAND TOTAL *	$33,876	$21,156	$18,614	$9,300	

* Major Improvements to, and Construction of, Government-Owned Facilities funded by Research, Development, Test and Evaluation.

1/ Transferred to Military Construction, Navy Appropriation.

1. COMPONENT	FY 1993 MILITARY CONSTRUCTION PROJECT DATA	2. DATE
		JAN 1991

3. INSTALLATION AND LOCATION	4. PROJECT TITLE
Naval Air Engineering Center Lakehurst N.J.	Electromagnetic Aircraft Launch System (EMALS)

5. PROGRAM ELEMENT	6. CATEGORY CODE	7. PROJECT NUMBER	8. PROJECT COST ($000)
63512N		P-229	10,000

9. COST ESTIMATES

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
Site construction	LS			9,300
Design	LS			1,000
Total Request				10,300
Equipment Provided From Other R&D Funding Lines	LS	NON-ADD		67,000
Design Funding required FY-91				
Construction funds required FY-93				

10. DESCRIPTION OF PROPOSED CONSTRUCTION

Advanced Development Model (ADM) prototype design and manufacture. Full scale prototype capable of launching fixed wing aircraft from carriers, independent of the ship's power plant, capable of accelerating deadloads at fixed accelerations.

Site Construction to include:

a. A catapult trough containment structure consisting of steel reinforced concrete built on foundation pilings and a steel framework for equipment mounting and support.
b. Deadload brake rail runouts consisting of steel tracks embedded in runway pavement.
c. Restraining buttress structures.
d. Additional runway pavement at R&D site
e. Concrete pads for Catapult control system, data acquisition system, and power plant equipment mounting.
f. Gravel drives and parking
g. Tunnels for maintenance, utilities, power and signals.
h. Safety barricades.

Equipment to be developed by contract to include control system, launcher and power system.

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COMPONENT	FY 1993 MILITARY CONSTRUCTION PROJECT DATA	DATE JAN 1991

INSTALLATION AND LOCATION
Naval Air Engineering Center, Lakehurst N. J.

PROJECT TITLE	PROJECT NUMBER
Electromagnetic Aircraft Launch System (EMALS)	P-~~224~~ 229

All portions of this project are nonseverable. The construction is required solely for the EMALS equipment and must be completed prior to equipment installation and testing. All items are interrelated and are to be considered nonseverable.

Requirement: Current launch equipment is massive in size and weight. Each steam catapult, including steam receiver, weighs 700 tons and occupies 40,000 cubic feet. Each launcher system, including the power source, shall weigh less than 125 tons and shall occupy a space of 15,000 cubic feet or less. The launch track machinery shall fit within the confines of the existing catapult troughs on CVN-68 Class Ships without ship structural modification.

Present catapults depend on steam provided by the ship's engineering plant. Should a casualty occur to the steam plant the catapults become unusable and the ship loses the defensive and offensive war fighting capability of its embarked air wing. The EMALS shall have it's own power system not dependant on the ship's propulsion plant.

Steam catapults are manually calculated and set. System operation has the potential for human error and aircraft loss. Variation in end speed in each catapult and between catapults can cause airframe overstress and reduce aircraft service life. The EMALS shall have a feedback control system for system self correction in the event of a missetting and for repetitive optimize performance for all aircraft types.

(4) Contract Number for Funding
N/A

(5) Provisions For Non-Owned Land
N/A

1. Component: Navy	FY 19 92 MILITARY CONSTRUCTION PROJECT DATA	3. Date: 29 Jan 91

2. Installation and Location: Department of Energy Oak Ridge Lab	4. Project Title: Full Scale Propulsor Project

5. Program Element: 64561M	6. Category Code:	7. Project Number:	8. Project Cost (Amount): $7.27M

9. Cost Estimates

Item	U/M	Quantity	Unit Cost	Cost (Amount)
Full Scale Propulsor Project				
Build an expansion to accommodate Assembly Requirement			$3.17M	
Reroute Air Handling, perform ceiling and foundation modifications			$3.95M	
Paint Facility modifications			$ .15M	

10. Description of Proposed Construction

Modifications to the Department of Energy(DOE) Lab/Oak Ridge - This includes the redesign, assembly, foundation and ceiling installation, ventilation restructuring and installation of environment controls.

11. Requirement:
Project: The DOE Lab at Oak Ridge is being used for the development of the SSN21 Prototype Propulsor.

Requirement: The Lab must be modified to accommodate large numerically controlled machines being utilized for the SSN21 propulsor.

Impact If Not Provided: Unless the modifications are completed to the DOE/Oak Ridge Facility, the schedule for the SSN21 will be severely impacted.

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